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Poverty Alleviation in Mexico

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The main determinants of poverty in Mexico are macroeconomic uncertainty, an urban bias in social and infrastructure spending, and institutional arrangements and government policies in rural areas that discriminate against the poor. Benefits to the poor should be administered under a single program that simultaneously delivers food (through coupons rather than price subsidies), preventive health services, and information on hygiene, birth control, and food handling.

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Among the findings is this ambitious analysis of poverty in Mexico:

Mexico's moderately poor lack some goods and services that everyone should enjoy, given Mexico's wealth. The extremely poor have so few resources as to be at risk of undernutrition and illness.

At most, 1. percent of the population is extremely poor (probably an overestimate), and extreme poverty is mostly a rural problem. The extremely poor have larger households, more children, and the highest dependency ratios.

The three main determinants of poverty are urban bias, macroeconomic uncertainty, and institutional arrangements and government policies in rural areas that discriminate against the poor. Urban bias in social and infrastructure spending reduces the rural poor's ability to increase their human capital. Macroeconomic uncertainty and stop-go cycles depress the permanent demand for unskilled labor and the steady stream of social spending. Institutional arrangements and resource allocation policies to increase agricultural output deliver substantial rents to high-income agricultural producers while depressing returns to land and the demand for unskilled rural labor, the two main assets of the rural poor.

Development policies to help the poor should focus on:

- Furthering the process of institutional reform of the incentive structure in rural areas.

- Changing the way resources are channeled to rural areas (eliminating price subsidies and increasing investment in rural roads, irrigation, extension services, and the like).

- Eliminating urban bias in social and infrastructure spending

- Bringing private costs of production in urban areas in line with social costs.

Policies to alleviate poverty must allow for the fact that the extremely poor are less able to bear risk, have higher fertility rates, have higher price and income elasticities of demand for food, and may experience more household inequality. The moderately poor, on the other hand, can migrate, can benefit from educational opportunities, and can participate more fully in the labor market.

There is a strong case for direct targeting of benefits onlt to the to the extremely poor. Such benefits should be administered under a single program that simultaneously delivers food (through coupons rather than price subsidies), preventive health services, and education about hygiene, birth control, and food preparation and conservation. Food pricing policies should be divorced from poverty considerations. A poverty program for the extremely poor should direct its efforts at reducing fertility, morbidity, undernutrition, and infant mortality.

Intertemporal, incentive, and administrative considerations all argue that the government can best help the moderately poor indirectly. This can be done through policies that increase the permanent demand for unskilled labor, returns to land, and the poor's access to education and social infrastructure.

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I. Introduction.

This paper is concerned with the problem of poverty in Mexico. Its four objectives are to: (i) present evidence, (ii) analyze economic determinants, (iii) discuss policy options, and (iv) assess existing poverty programs.

This is an ambitious agenda. In fact, one could argue strongly against attempts to cover so many issues at once. The objectives mentioned present difficult theoretical and empirical challenges, and require detailed and systematic work. On the other hand, something can be gained from a self-contained paper that presents an overview of the problem: it can help identify the key issues, point out areas where immediate action is likely to be beneficial, locate possible errors in current policies, and indicate gaps in our knowledge, so that future research can focus where its pay-off is high. This is what I attempt here. As the reader will notice, many hypotheses are introduced, but not tested; most topics are discussed, but none are thoroughly dealt with. The paper is therefore sui generis: neither a polished academic piece nor a policy document with concrete recommendations for action. Hopefully this approach will be useful.

I divide the paper into seven sections. Section II gives a very brief discussion of recent economic events, as these set the stage for poverty programs in the 1990's. Section III discusses the concept and measurement of poverty. Section IV presents evidence of the extent of poverty in Mexico. It aims at answering the question: who, where and how poor are the poor? Section V asks the question: why are the poor poor? I review issues of rural development, urban bias and macroeconomic policy. Section VI turns to policy centering on two issues: what should government's objectives with regards to poverty be, and what are the appropriate instruments to use. To answer these questions I review the 'stylized facts' about the behavior of the poor, as well as information and incentive issues that bear on the design of poverty alleviation programs. I then suggest policies for alleviating extreme and moderate poverty. Section VII assesses, in the light of previous findings, current government programs to alleviate poverty and offers some suggestions for improvement. A summary of results and unanswered questions is presented in Section VIII.

II. The Setting.

After a period of rapid growth during the oil boom of 1978-1981, the Mexican economy entered a prolonged crisis, triggered by a negative terms of trade shock and increases in world interest rates. The crisis proved deep given the large fiscal deficit, the over valuation of the exchange rate, and the external debt. Since 1983 the bulk of policy makers' efforts have centered in the areas of short run stabilization and adjustment to the change in the direction of external capital flows.

As the adjustment process was underway, it became clear that short run macroeconomic policies, per se, were insufficient to achieve sustained growth. In consequence, concomitant with the adjustments in macroeconomic policy, further structural changes have been progressively introduced. A program of trade liberalization in the manufacturing sector was initiated in 1985 and accelerated in 1988. Subsidies granted through the pricing policies of public enterprises have been reduced. Regulations on direct foreign investment have been relaxed. Regulations on internal trade have been liberalized, allowing freer entry and exit (e.g., transportation). Private investment has been authorized in areas previously reserved for the government (e.g., petrochemicals). Tax laws have been modified to reduce evasion and increase efficiency. A program of privatization of public enterprises is currently underway; commercial banks nationalized in 1982 are being re-privatized. Finally, a renegotiation of the private external debt has been accomplished[1].

These impressive changes are a manifestation of a change in the government's role in the economy. Far from a simple retrenchment caused by a temporary scarcity of funds, the Mexican government is embarked on a radical redefinition of its role in the economy, its responsibilities, and the nature of its interventions. Its role as producer is diminished (with a few exceptions like oil and electricity). Its role as regulator is changing: at the macroeconomic level to set credible and sustainable policies; at the micro level to promote the efficient operation of markets. At the same time, the government maintains its commitment to improve the welfare of the poor.

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[1]Van Wijnbergen (1990, p. 32) argues that the 1989 debt re-negotiation package "..seems sufficient to establish a basis for sustained growth in Mexico."

Three characteristics of the economic environment in the 1990's are important in thinking about poverty. One, servicing the foreign debt will continue to be an important constraint on policy, despite the renegotiation of the private component of the debt. This, together with the overriding need to keep the fiscal deficit under control, implies that stringent resource constraints will continue (barring a large and sustained positive terms of trade shock). And while the government's role as producer and investor is reduced, there are large gaps in infrastructure that need attention, particularly so given the cutbacks imposed during the 1980's. An attack on poverty requires resources. Yet, given this environment, poverty programs must only reach the target population, and do so in a cost effective way.

Two, structural reforms have enhanced the role of market forces in resource allocation. In this context distortions in relative prices prove counterproductive as the economy produces the wrong bundle of goods, or does so with the wrong techniques: it is essential that prices, including the product wage, reflect opportunity costs. Poverty programs must recognize this. To the extent possible, these programs must avoid, or minimize, subsidies and price controls.

Three, the structural reforms implemented so far are lopsided. The environment for industry has been substantially more liberalized than that for agriculture, both with regards to external and internal regulations. Trade reform has concentrated mainly in manufactures; this sector now operates under a mostly tariff trade regime[2] with relatively few restrictions on entry and exit. Its legal and institutional environment is well defined; property rights are identified. The same is not true of agriculture. The external trade regime is more controlled; there are significant restrictions on entry and exit; property rights are at times uncertain. The reform gap is, at present, one of Mexico's key problems. If not attended soon it can deepen disparities in income levels. Reform of agriculture is now essential to redress the balance. Poverty programs must not only aim at providing minimum welfare levels for the poor. They must also be part of a larger strategy that incorporates lagging regions into the rest of the economy.

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[2]At the time of writing most sectors of manufacturing had no prior permits, licenses or QR's. Significant sectors where restrictions remain are automobiles, pharmaceuticals and computers. Production weighted tariff rates average 12.6%, with a standard deviation of 4.3% (World Bank, 1989c, Vol. II, p. 79).

III. Poverty: Concepts and Measurement.

III.1 Concepts.

A recent study of poverty in Mexico argues that approximately 60% of the population could be classified as poor (Hernandez Laos, 1989a, p. 29). Of this total, between 20 to 25% were estimated to live in extreme poverty, with the remaining 35 to 40% being poor, but not extremely-poor. Given an estimated total population of 81 million in 1990, this study implies that 20.2 million Mexicans were living in extreme poverty, with an additional 28.4 million living in poverty. A separate study estimated the number of poor people at 21.6 million, but made no distinction between poverty and extreme poverty (World Bank, 1989a, p. i). Another study states that in 1982 21% of all Mexican households were desperately poor (World Bank, 1989b, p.1). And yet another World Bank study states that 25 million people in Mexico are poor, with seven million at the destitute level (World Bank, 1990b, p. 5).

Data problems aside, disparities in estimates arise from different definitions of what poverty is, and of different methods of estimating it. It is very important to determine just how many are poor and how many are extremely-poor. Overestimates can make the task of eradicating poverty look almost impossible; they may also imply wastes, as resources that could be used for the extremely-poor are spread across larger groups. Underestimates leave some desperate people without help. Equally important, confusing poverty with other phenomena like income inequality leads to wrong policies. To provide a framework for measurement, and to properly identify the target populations for what could potentially be different policies, one question is unavoidable: what is poverty?

To answer this question, I begin by observing that poverty and income inequality are two distinct problems. Figure 1 illustrates the point: the vertical axis measures y_i, the income of the ith individual[3], while the horizontal axis measures the total population of the country (n), ordered by increasing income. In turn, z denotes the 'poverty line', or the income level below which a person is considered to be poor; finally, f(y) denotes the

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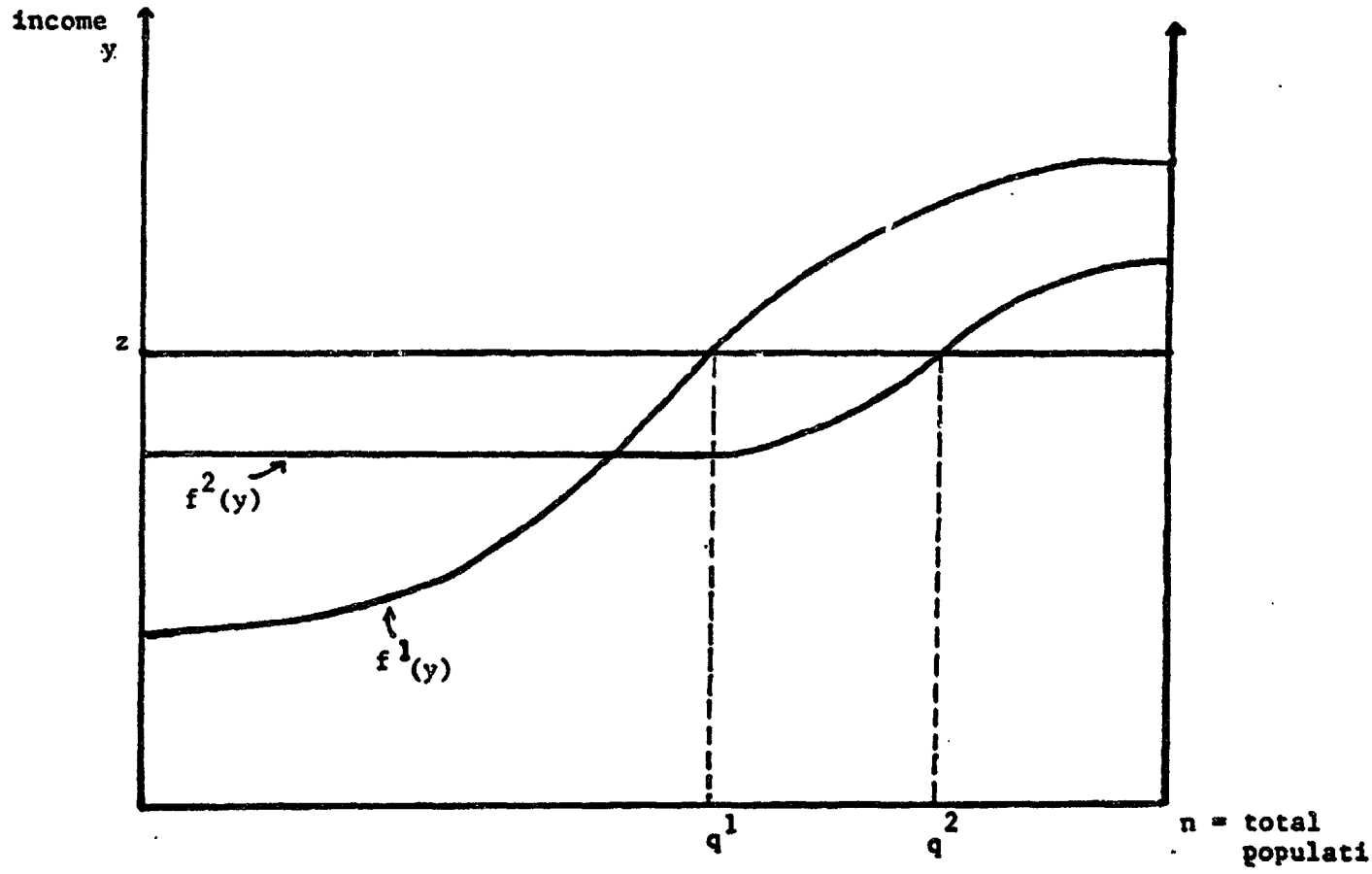
[3]The important distinction between individuals and households is discussed in section IV.1. At this point no harm is done by thinking of either households or individuals as the unit of reference.

Figure 1



distribution of income. Assume that $\int f^1(y)dy = \int f^2(y)dy$. By some measures of inequality (e.g. the Gini coefficient) $f^2(y)$ is a more equal distribution of income than $f^1(y)$. Yet, by some measures of poverty, e.g. the head-count ratio[4], poverty is greater under $f^2(y)$. Policies that reduce income inequality may, but need not, reduce poverty. In this paper I focus on poverty.

Next, I make a distinction between moderate and extreme-poverty. A working approximation to this distinction is to say that extreme-poverty is an absolute condition, while moderate-poverty is a relative condition. The extremely-poor are those who cannot secure enough nutrition to function adequately. People that are undernourished are more vulnerable to disease, are at risk of developing anthropometric deficiencies, are at times lethargic and, in general, are less able to lead a healthy life with sufficient energy to satisfactorily perform tasks in the labor market and/or participate in educational activities. Extreme-poverty in this sense is invariant to time and, within limits, space[5]. The moderately-poor, on the other hand, cannot avail themselves of what, at the given stage of the country's development, are considered basic needs. However, their situation is fundamentally different to the extent that their health and nutritional status allows them to actively participate in the labor market; to take advantage of educational opportunities; to have mobility; to bear more risk. Their poverty is relative in the sense that they lack some goods and services which, given the national wealth, everybody should enjoy. Lack of primary education can be seen in Mexico in the 1990's as a condition of poverty. This was perhaps not the case 100 years ago. The same is true with lack of access to electricity. The line of moderate-poverty, as opposed to that of extreme-poverty, has a larger subjective component; this is unavoidable. The line of moderate-poverty

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[4]The head-count ratio, H, is defined as the proportion of the total population living in poverty. In figure 1 $H = q/n$; clearly, $H^2 > H^1$.

[5]Note that by this definition extreme-poverty is, in principle, an individual-specific condition, as the nutritional needs of individuals of the same age and sex performing similar tasks may differ. In addition, for a given individual nutritional needs are defined as a band, not a point; see section III.2 below.

attempts to answer the question: when do people cease to be poor? Clearly, cultural and political issues are inexorably linked here[6].

From the point of view of policy distinguishing between moderate and extreme-poverty is very important. As argued more fully in section VI, the moderately-poor can best be helped by policies that widen the set of opportunities open to them. But the extremely-poor must first improve their health and nutritional status to be able to fully profit from such policies. The concept of extreme poverty thus identifies a set of individuals who need direct help to be able to fully benefit from general policies designed to reduce poverty; the extremely-poor constitute the target population for special programs. The concept of extreme poverty, in addition, helps to identify what benefits need to be delivered, where, and in what priority (cf. section VI.4).

Unfortunately, the distinction between moderate and extreme-poverty cannot be made with great precision. Some ambiguity is unavoidable since it is impossible to draw a sharp line to separate those who, as a result of their better nutritional status, can 'function adequately', from those who cannot. Section IV.2 shows that demographic, expenditure, and other characteristics of households follow a continuum when households are ranked by per capita household income. Households with similar incomes have similar characteristics, but differences in these characteristics become significant as differences in income get larger. Hence, although low and high income households are distinct, households that are slightly above the line of extreme-poverty (denoted by z) and households that are slightly below are not. Yet, for operational purposes policy makers need a cut-off line. The challenge is to set this line at the point where it minimizes the probability of leaving out of directly targeted programs truly destitute people (which is achieved by setting z high), while at the same time recognizing that resource constraints and incentive considerations imply that not all individuals can, or should, recieve directly targeted benefits (which is achieved by setting z low). A line of extreme poverty based on nutritional status is useful because

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[6]Sen (1984a) and Streeten (1989a) provide a useful discussion of this issue. In particular, Sen argues that a distinction needs to be made between the space of 'capabilities' and the space of commodities. Poverty can be absolute in the former (what is needed to perform well), while relative in the latter (as the list of commodities required to perform well varies through time and location).

nutritional status is closely associated with many of the characteristics of households that require them to receive direct benefits before they can fully participate in the development process.

I end this sub-section with two remarks. The first concerns the temporal dimension of poverty. There is a life-cycle and some people are poor while young, but accumulate through life so that poverty reduces with age. Unfortunately, there is no longitudinal data to trace poverty across time. I assume here, however, that the life-cycle component of poverty, particularly for the extremely-poor, is less important than the permanent component. Most of the extremely-poor are born and stay poor throughout their lives[7].

Second, the discussion has centered on moderate and extreme-poverty as a general manifestation of lack of resources. This is sometimes labelled primary poverty to distinguish it from secondary poverty. The latter is a condition derived from inefficiency in the use of resources: people that are poor because they misallocate their income in the wrong diet, suffer from alcoholism or, perhaps more significant, have some form of physical (e.g. very old age, crippled) or psychological (e.g. mental retardation) problem that interferes with their productive life. Without negating the importance of this phenomenon, it is most likely the case that its quantitative relevance for Mexico is significantly lower, and that the policies (and institutions) required to alleviate it are also different.

In this paper I focus on primary poverty: the set of individuals that, for reasons explored below, are able but have welfare levels below those deemed acceptable. With the right set of policies most of these individuals can increase their productive potential and, therefore, Mexico's national income. Political and ethical considerations aside, reducing primary poverty should not be seen as a burden on the government's budget. Rather, it should be seen as a socially profitable investment. This investment, as any other, will have a gestation period and, to produce results, must be pursued systematically. The challenge is to find policies that, given the setting of the Mexican economy in the 1990's, will make the investment profitable.

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[7]Schultz (1981) finds that for Colombia the life-cycle component of poverty is less significant than the permanent component.

III.2 Measurement.

Is extreme-poverty mostly a rural phenomenon? Political considerations aside, which regions should be targeted for poverty alleviation programs? Policy makers need to know the number of people living in moderate and extreme-poverty. But they also need to know how poor are the poor, where they are located, what the regional composition of national poverty is, and how much of total poverty is accounted for by the moderately-poor and the extremely-poor. One often finds large numbers of indicators quoted in poverty discussions (life expectancy, literacy rates, child mortality rates, access to piped water, number of hospital beds per region, etc.). This information is useful as evidence of poverty, but is less useful for policy. To the extent that these indicators are highly correlated with each other, any one would suffice. To the extent that they are not, policy makers need to know which should guide resource allocation. In addition, many of these indicators confuse inputs with outputs: we do not really care about the number of hospital beds per region but about health status; longer life expectancy is a result of good nutrition and healthy lives.

Multiple indicators of poverty have been used in previous studies of poverty in Mexico. In particular the influential study by the Coordinacion General del Plan Nacional de Zonas Deprimidas y Grupos Marginados (henceforth Coplamar), computes an 'indice de marginalizacion' from a list of 19 different socioeconomic indicators. For four reasons this is a doubtful procedure. One, the list of indicators is to some extent arbitrary, and mixes issues of lack of infrastructure with evidence of extreme-poverty. Two, the weights on the 19 indicators calculated at the state level are not equal to the regional weights, which in turn are not equal to the municipal weights (see Coplamar, 1985c, pp. 30-56). Three, the sign of the weights varies as the geographical level of aggregation changes[8]. Fourth, the index of marginalization provides no information about the depth or distribution of poverty, and cannot be used to rank regions to allocate resources in a poverty alleviation program[9].

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[8]The weights for the marginalization index are obtained using the method of principal components, i.e., the weights are the elements of the eigenvector associated with the dominant root of the square matrix formed from the product of the region/indicator matrix times its transpose; there is no guarantee that this eigenvector is non-negative (and indeed it is not).

[9]To the extent that Coplamar's indice de marginalidad is used by current government programs for poverty alleviation, there is a risk of mis-targeting the population; I return to this point in section VII.2.

Measuring poverty consists of two tasks. First, a poverty line must be determined. Second, the poverty level of individuals has to be aggregated. This sub section deals with the first issue, sub-section III.3 tackles the second. Data and numerical results are presented in section IV.

Two methods can be employed to set the poverty line. In the first one a single indicator is used (e.g. nutritional intake)[10]. In the second one a list of commodities considered essential is made. Following the previous discussion, I argue that access to adequate sources of nutrition should provide the benchmark for setting the line of extreme-poverty. Hence, I define the extremely-poor as those individuals who are unable to purchase enough nutrients which, given age and sex, allow to maintain health and performance. The required level of nutrient intake is set at 2250 calories per day for an adult.

Three comments are relevant in relation to this definition. First, caloric intake is taken as the reference point for nutritional status. The bulk of the evidence shows that protein and caloric intake are highly correlated: people that fulfill their caloric needs will most likely also satisfy their protein requirements[11]. Second, the definition makes no

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[10]The minimum wage is sometimes used in Mexico to set the poverty line (e.g. World Bank (1989a)), Lustig (1984)): poor households are those earning less than the minimum wage. This poverty line is at times also used by the government to discriminate among households for some of its food subsidy programs (see section VII.2, below). This procedure is probably inappropriate. The real wage is subject to transitory deviations arising from macroeconomic shocks, and may also respond to political considerations. For example, if the real wage declines then, ceteris paribus, the number of poor people falls. Conversely, if for political considerations the minimum wage is increased, poverty increases.

[11]"Malnutrition is not primarily a problem of an imbalance between calories and proteins. Most surveys have found that if energy intake is adequate, protein needs are also satisfied, and if not, protein is burned up for energy requirements" (Streeten, 1989b, p. 4). Also: "There is today relative consensus that the indicator 'intake of calories' is more representative of the whole nutritional problem than the quantities of proteins or other nutrients" (Garcia et. al., 1986, p. 33; my own translation, S.L.). This is not to say that there will be no deficiencies of some vitamins and other key nutrients like iron, iodine, and calcium. But these deficiencies may arise from cultural factors that determine the type of diet, and not from lack of resources; people with higher incomes can show these deficiencies too. As mentioned below, a distinction between undernutrition and malnutrition is required.

reference to the composition of the diet; extreme-poverty is measured with respect to a diet based on the preferences of individuals as well as the prices ruling in the area[12]. Third, the target level of 2250 calories a day per adult equivalent is taken from WHO/FAO food adequacy standards appropriately modified to the climatic conditions of developing countries[13]. Satisfaction of this calorie intake avoids undernutrition and permits individuals to, in principle, stay healthy and participate in an active life (including satisfactory performance of tasks in the labor market). Conversely, risks of severe undernutrition with permanent effects (particularly for children under five), above-normal vulnerability to disease, and anthropometric deficiencies appear when calorie intakes are, for a sustained period of time, below this level (Lipton (1983a)).

The use of nutritional status as a benchmark for measuring extreme-poverty is not without problems. This is because the same nutritional intake is taken as reference point for all the (adult equivalent) population. This procedure is problematic because even after making corrections for climate and work conditions, it fails to account for intra and inter-individual variations in nutritional requirements[14]. Some researchers, moreover, claim that the

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[12]This contrasts with 'minimum cost' diets found using linear programming techniques that also satisfy a nutritional objective. This technique was used by Coplamar to measure undernutrition (Coplamar, 1985a, pp. 101-23). But note that the calculated diet may not be desired by households, since it is derived independently of their preferences. Significant econometric evidence shows that issues like palatability, status, and odor matter in food selection, even at very low income levels (see the discussion in section VI.1, below). The approach also contrasts with exogenoulsy given diets either chosen by nutritionists or government agencies that specify target levels of individual foods. Rationality of the extremely-poor is assumed, given their information.

[13]See the extensive discussion in Lipton (1983a). Many other studies for LDC's also use this reference point (e.g. Greer and Thorbecke (1986a) for Kenya). However, the World Bank (1989b, p. 32) uses a reference point of 2,120 for Mexico; a similar number is used by Lustig (1984) and Cepal (1990)). On the other hand, the National Institute of Nutrition sets the standard at 2,600.

[14]Srinivasan (1981, p. 17) argues that: "Many of the widely used procedures for assessing nutritional status, by classifying all individuals in a population as malnourished who have intakes below a single average norm for the population as a whole, thereby ignoring intra and inter individual variance in intakes and requirements, will misclassify individuals to varying degrees. This misclassification bias need not cancel out for the population as a whole and there is danger of overestimating the proportion of truly malnourished" (emphasis added, S.L.).

autoregulatory homeostatic nature of the body allows for substantial variability in energy intake[15], and that such variability creates a band of up to 20% around the reference nutrient requirement where intakes can vary. It is only when intake is below the lower bound of the band for a sustained period of time (e.g. below 1,800 calories per day per adult) that undernutrition appears as a permanent condition, with its associated risks.

These arguments imply that longitudinal data is required to identify the extremely-poor and, in addition, that corrections for individual variances in nutritional requirements should be made. Unfortunately, the data to carry out these computations in Mexico is at present unavailable. As a result, if 'access to adequate sources of nutrition' is used to measure the line of extreme-poverty, the use of averages is unavoidable and, as with any other procedure, some errors of classification will be made.

Estimates of undernutrition in Mexico vary widely, from 20 to 50% of the population (cf. Lustig, 1984, pp. 443-47). Most of these estimates are made comparing the monetary costs of a 'desired' reference intake of nutrients (given, in most cases, by an exogenously determined diet as in the Coplamar study mentioned before) with actual food expenditures by households[16]. These estimates are: one, subject to the Srinivasan-Sukhatme type of criticisms

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[15]"There is considerable evidence to show that a healthy, active individual engaged in fixed tasks and maintaining near constant body weight enjoys wide flexibility in intake" (Sukhatme, 1988, pp. 374-75). On the other hand, Behrman and Deolalikar (1988, pp. 654-55) argue that this evidence is based on small sample sizes that are not representative. (But Edmundson and Sukhatme (1990) present more evidence to reinforce Sukhatme's thesis.)

[16]The Coplamar estimates imply that undernutrition in Mexico is almost non-existent for the lowest decile of the income distribution: urban (rural) households consume 92.65 and 95.71% (117.68 and 98.89%) of the recommended daily intake of 2082 calories and 63 grams of protein, respectively (see Coplamar, 1985a, tables A-3.14 and A-3.15). On the other hand, the World Bank (1989b, p. 32, table V.1) presents data to show average intake of calories in rural households in 1979 in the following states as: Chiapas, 1609; Oaxaca 1483; Guerrero 1638; Coahuila and Nuevo Leon 1684; Hidalgo 1703; Veracruz 1746; Yucatan 1755. Unfortunately, it is not clear what the reference point is: if it is average intake at a point in time, or average intake for a sustained period of time. In the latter case the situation is very serious, but need not be in the former.

mentioned above[17]. Two, do not allow for differences in preferences across households. Given these difficulties, a strong case can be made for measuring undernutrition using anthropometric indicators like height for age and weight for height. Unfortunately, the available evidence of undernutrition is not systematic, although there are signs that it does exist[18].

It is difficult to put together these conflicting pieces of evidence and to ascertain the significance of undernutrition in Mexico. But two points can be made: first, a sharper distinction between under and malnutrition is required (cf. Schiff and Valdes (1990)). Undernutrition reflects lack of resources to buy adequate amounts of food; malnutrition reflects improper choice of food given incomplete information on the part of the consumer and other problems of the environment. As section VI argues, the policy implications differ. Second, systematic data on nutritional status in Mexico that differentiates between under and malnutrition is needed. Until such evidence is gathered there is a risk that resources for poverty alleviation be targeted to the wrong population, or wrong policies applied to the right population. Pending such evidence, however, second-best methods to determine the poverty line for the extremely-poor and the moderately-poor have to be used. Before I discuss these methods, I turn to describe the construction of operational poverty indices.

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[17]A related problem is generated by the presence of intra-household inequality (of which more in section VI). Even if sufficient food is available, it may be unequally distributed within the household. Sen puts the matter aptly: "The requirement-intake comparisons also suffer from the serious problem of getting accurate information on the food intake of each individual member of the family. Obviously, food-purchase data are not adequate for this. Family members need to be observed eating, and -more than that- the food partaken would have to be weighed in the process of its journey from the plate to the mouth... So the actual intake figures may well be no more reliable than the alleged 'requirement' figures, and the blind shall lead the blind. All of this is, in fact, quite the wrong way of going about the problem. If nutrition is what we are concerned with, then nutrition is what we must observe. We have to look not at food intakes, but at signs of undernourishment" (1984b, pp. 382-3).

[18]For example, a World Bank report based on 1988 data (World Bank, 1990a, p. 1, table 1) shows that 14% of all children show below normal weight for age (which can be thought of as a measure of cumulative nutrition), while 15% of all babies show low birth weight. In addition, one-third of women of reproductive age are underweight.

III.3 Operational Measures of Poverty.

Denote by $\underline{z}$ the monetary line of extreme-poverty: the minimum income required for a household of given age and sex composition, and the environment in which it lives, to purchase sufficient food to avoid undernutrition[19]. Denote by $\bar{z}$ the monetary line of moderate-poverty; this line exceeds the line of extreme-poverty by the cost of the necessities beyond those included in $\underline{z}$ that society (policy makers? economists?) deems are required so that people are not considered poor. Given a poverty line ($\underline{z}$ or $\bar{z}$), it is necessary to aggregate the level of poverty of individuals. An index of poverty that can serve as a summary statistic about the level of poverty is useful because: one, it can provide quantitative answers to the questions posed at the beginning of sub-section III.2. Two, it can help determine how poverty changes overtime; a poverty program needs to monitor how much progress is being made, and tracking an index of poverty is a simple and practical way of systematically doing such evaluation. Three, it can help to rank regions in the allocation of resources for poverty (as discussed in section VI.4). Of course, a single index may fail to be a sufficient statistic of all dimensions of poverty; unavoidably, relevant information gets lost in the aggregation process. Yet indices, properly used, give useful insights. To provide quantitative assessments of the extent of poverty, and to provide a mechanism by which progress in poverty alleviation can be monitored, this sub-section discusses some properties of poverty indices[20].

I begin by noting two desirable axioms that an index of poverty should satisfy (Sen (1976)): Monotonicity: given other things, a reduction in the income of a poor household must increase the poverty index. Transfer: given other things, a pure transfer of income from a poor household to any other household that is richer must increase the poverty index.

These two axioms are discussed with the help of figure 2, where three distributions are plotted. Note that in all cases the number of people living

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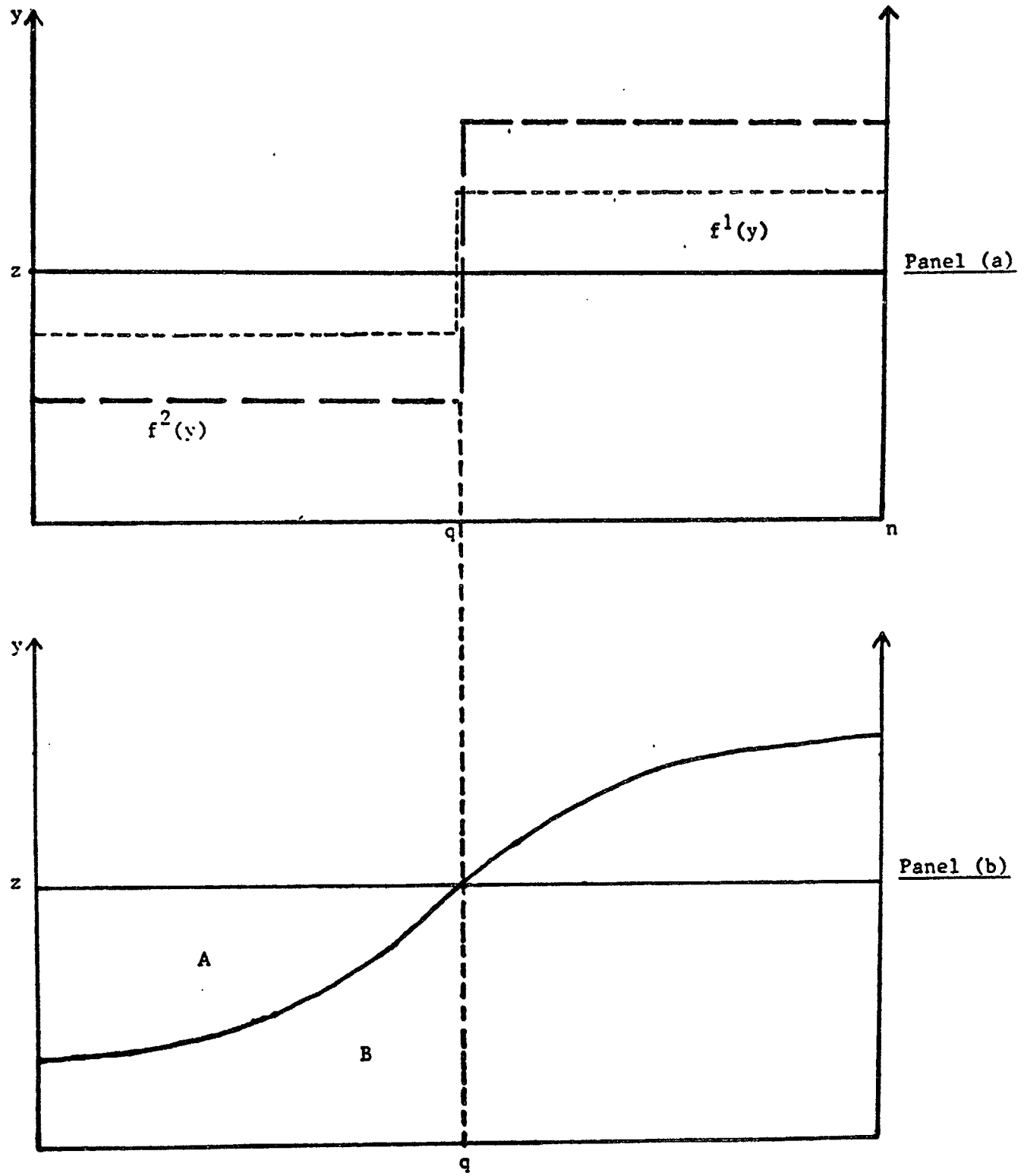
[19]Note that $\underline{z}$ is made contingent on the environment. This is so because even if relative prices are the same across regions, the same income level may translate into different nutritional status. As I discuss in section VI.4, the relationship between income and nutrition is mediated by other factors.

[20]There is a large theoretical literature on the measurement of poverty and the construction of poverty indices. A seminal paper is Sen (1976); further contributions are by Takayama (1979), Foster, Greer and Thorbecke (1984), and Atkinson (1987).

Figure 2



in poverty is the same, so that the three distributions have the same head-count ratio (H = q/n). Yet, it is intuitive that the poverty situations described by these distributions are different. Contrast distributions $f^1(y)$ and $f^2(y)$ in panel (a): clearly, $f^1(y)$ is better in the sense that the poor are, all of them, less poor than in $f^2(y)$. Yet, the head-count ratio would not indicate this. Moreover, if the income of any poor household (or all!) increased, but still remained below z, the head-count ratio would remain invariant. Evidently, however, poverty would be less. Panel (b) illustrates a different phenomenon. The poverty level of all the people below z is not the same. Those close to q are almost non-poor, while those close to the origin are the poorest of all. Yet, the head-count ratio provides no information about this. Statements like "x number of Mexicans are poor" or "y % of Mexicans are living in poverty" are therefore only partly useful. The problem with the head-count ratio is that it says nothing about the severity (or depth) of poverty nor about the distribution of poverty. Put differently, the head-count ratio satisfies neither the monotonicity axiom (severity of poverty) nor the transfer axiom (distribution of poverty).

Foster, Greer and Thorbecke (1984), FGT, have developed a class of poverty indices that incorporate these concerns. Define the poverty gap for the ith individual, g_i, as:

$$(1)\quad g_i = \max\,[(z - y_i),\ 0]$$

The FGT poverty index, denoted by $P(\alpha,z)$, is:

$$(2)\quad P(\alpha,z) = 1/n \sum_{i=1}^{q} (g_i/z)^{\alpha} \qquad \text{for } \alpha \geq 0.$$

where q is the number of individuals for which $g_i > 0$, i.e., the number of people below the poverty line. The parameter α is interpreted as a measure of societies' aversion to poverty; as it increases greater weight is attached to the poverty gap of the poorest individuals. FGT show that for $\alpha > 0$ P(.) satisfies the monotonicity axiom, while for $\alpha > 1$ it satisfies both axioms[21].

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[21] In addition, for $\alpha > 2$ P(.) satisfies a further axiom known as the transfer sensitivity axiom: If a transfer $t > 0$ of income takes place from a poor individual with income y_i to a poor individual with income $(y_i + d)$, $d > 0$, then the magnitude of the increase in poverty must be smaller for larger y_i. In other words, this axiom gives more weight to transfers at the lower end of the distribution than at the higher end.

The FGT index has a number of properties that make it useful for policy purposes[22]. In particular, P(.) is additively decomposable, with population shares as weights. Hence, the national poverty index can be decomposed into a series of regional poverty indices which measure the contribution that poverty in each region makes to the national total. In addition, for special values of α various well-known measures of poverty are obtained. Note first from (2) that for $\alpha = 0$ we have:

(3) $P(0,z) = q/n = H \quad \epsilon [0,1]$,i.e., the head-count ratio.

Similarly, for $\alpha = 1$ we have:

$$(4)\quad P(1,z) = (1/n.z).\sum_{i=1}^{q} g_i,$$

Now, the total income required to eliminate poverty is given by Σg_i, or area A in panel (b) of figure 2. This allows us to define the income-gap ratio, I, as:

$$(5)\quad I = \sum_{i=1}^{q} g_i/q.z \quad ; \quad I \epsilon [0,1]$$

or A/(A + B). It follows that:

(6) $P(1,z) = H.I = P(0,z).I$

i.e., P(1,z) is the income-gap ratio normalized by the head-count ratio. As opposed to P(0,z), P(1,z) is sensitive to the severity of poverty: it increases when more people become poor (H goes up), and when on average people become poorer (I goes up). However, neither is sensitive to the distribution of poverty, i.e., they do not satisfy the transfer axiom. However, the index:

$$(7)\quad P(2,z) = (1/n).\sum_{i=1}^{q} (g_i/z)^2.$$

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[22]Atkinson (1987) shows that the FGT class of poverty indices belong to a larger class of poverty indices that satisfy a restricted form of a second-degree stochastic dominance condition. This is a useful condition in making comparisons overtime as to whether poverty has decreased or not when the distribution of poverty changes.

satisfies both axioms. As a result, I use it as the basic index of poverty in the remainder of the paper.

Since P(.) is an index, it provides, by itself, little information. However, as mentioned above, P(.) is additively decomposable. Thus, let the total population of the country, n, be divided into m regions, with n_j (j = 1,2,....m) individuals in each region. For concreteness, think of m as the number of states in Mexico, so that n_j is the population of each state. FGT show that P(2,z) can be re-written as:

$$(8)\quad P(2,z) = \sum_{j=1}^{m} (n_j/n).P_j(2,z), \qquad \text{where:}$$

$$(9)\quad P_j(2,z) = (1/n_j).\sum_{i=1}^{q_j} (g_{ij}/z)^2,$$

with q_j denoting the number of poor individuals in the jth state, and g_{ij} the poverty gap of the ith individual in the jth state. Alternatively, let:

$$(10)\quad P(2,z) = \sum_{j=1}^{m} Q_j \qquad \text{where } Q_j = (n_j/n).P_j(2,z)$$

so that $T_j = Q_j/P(2,z)$ is interpreted as the (%) contribution of the jth state to national poverty. Of course, this decomposition can be repeated a second time: the poverty index for any state, $P_j(2,z)$, can be written as the weighted sum of the poverty indices of the individual municipios (counties) within the state. Since the index is additively decomposable at this second stage, the procedure yields a decomposition of total national poverty into the components accounted for by each state and, within each state, by each municipio. Thus a geographical poverty profile is constructed; this provides key information to identify target regions for poverty programs (see section VI.4 below).

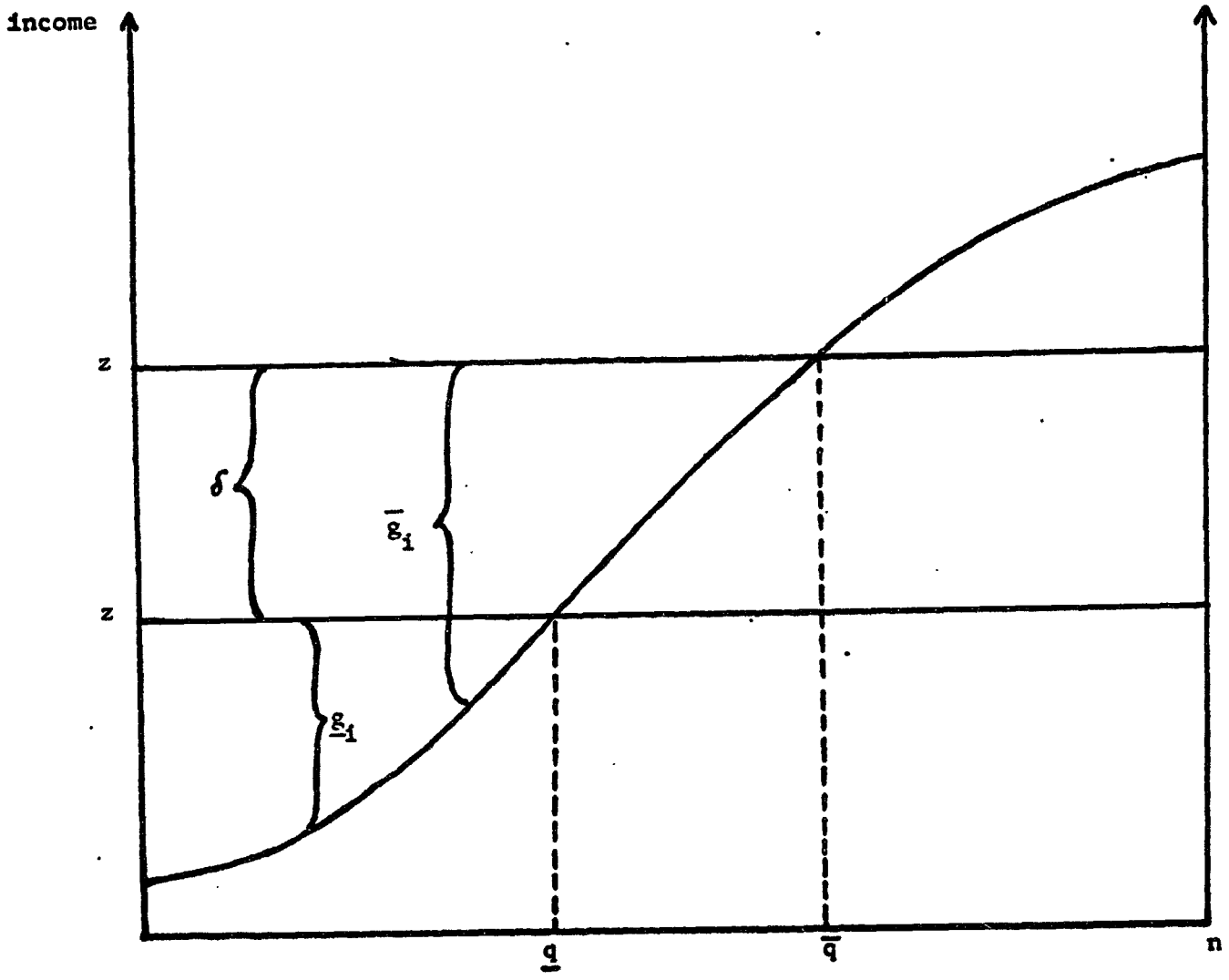
Figure 3 develops an obvious extension of the FGT poverty index to separate the moderately-poor from the extremely-poor. Note that I label δ the income difference between the two poverty lines; in addition, the poverty gaps for each group are now denoted as:

(11) $g_i = \max [(\underline{z} - y_i), 0]$

(12) $\bar{g}_i = \max [(\bar{z} - y_i), 0] = \max [(\underline{z} + \delta - y_i), 0]$

I label $P(\alpha,\underline{z})$ the index of extreme-poverty and $P(\alpha,\bar{z})$ the index of moderate-poverty. These two indices can then be decomposed across states and municipios along the lines indicated above. It is clear that the increase in the poverty index when raising the poverty line from $\underline{z}$ to $\bar{z}$ depends on two factors: first, on the size of δ. Second, on the shape of the distribution function between $\underline{q}$ and $\bar{q}$, which determines how many people are added to the ranks of the poor when raising the poverty line by δ. As figure 3 makes clear, if the distribution function f(y) is relatively (steep) flat, for a small change in δ the number of people in poverty increases substantially (minimally). Of course, the change in the poverty index also depends on α, that captures how the poverty gap of the extremely-poor is weighted vis-a-vis the poverty gap of the moderately-poor.

Figure 3



IV. Quantification of Poverty.

IV.1 Data.

IV.1.A. The Income-Expenditure Survey of 1984.

The most recently available income-expenditure survey (IES) for Mexico, carried out by the Instituto Nacional de Estadistica, Geografia e Informatica (INEGI), is for 1984 (SPP (1984))[23]. I make five observations on the data. First, about 5,000 households (the unit of observation) during each trimester of 1984 were surveyed. However, since some questionnaires were improperly filled out, the actual size of the sample for the whole year is 18,958. Second, the IES does not directly distinguish between urban and rural areas. Rather, households are characterized by the population density of the area in which they live, and grouped into two categories: 'high' and 'low' density areas. The former are municipios with at least one of the following characteristics (see INEGI, 1984, p. 30): (i) at least one locality with more than 15,000 inhabitants, (ii) a total of more than 100,000 inhabitants, (iii) be the capital of the state, or (iv) be part of any of the twelve largest metropolitan areas of the country. In this paper I use 'low' ('high') density areas as equivalent to rural (urban) areas[24].

Third, the sample was designed such that results are representative of the urban and rural regions only at the national level; unfortunately, the sample is not representative at the state level. Table 1 summarizes the number of households surveyed in each state and region; note that there are eleven states where rural households were not surveyed

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[23]Although a similar survey was carried out in 1989. Unfortunately, the results of this latter survey are not yet available.

[24]Other authors divide the population into urban and rural using the occupation of the household head: rural households are those where the household head is a 'jornalero rural o peon de campo' (roughly, landless agricultural worker). I find this procedure inadequate because it misses an important category of rural inhabitants, the ejidatarios, who are sometimes classified as 'patron' (employer with one to five employees) or as 'trabajador por cuenta propia' (self-employed worker); see INEGI (1984, p. 144). On the other hand, if self-employed workers or employers with one to five employees are included in the definition of rural, one then adds incorrectly all the urban self-employed as well as small scale urban employers. Thus, the low/high density approximation seems to be better since it focuses directly on a geographical concept.

Table 1

Sample Characteristics

State Number	State Name	Number of households sampled: Urban	Rural
01	Aguascalientes	163	0
02	Baja California Norte	302	0
03	Baja California Sur	152	0
04	Campeche	271	0
05	Coahuila	418	0
06	Colima	157	355
07	Chiapas	278	553
08	Chihuahua	563	355
09	Distrito Federal	1407	0
10	Durango	145	0
11	Guanajuato	447	398
12	Guerrero	313	0
13	Hidalgo	141	180
14	Jaliso	1096	181
15	Mexico	989	502
16	Michoacan	470	180
17	Morelos	226	208
18	Nayarit	141	0
19	Nuevo Leon	961	168
20	Oaxaca	160	186
21	Puebla	410	385
22	Queretaro	286	195
23	Quintana Roo	153	184
24	San Luis Potosi	165	210
25	Sinaloa	315	326
26	Sonora	432	345
27	Tabasco	152	0
28	Tamaulipas	430	545
29	Tlaxcala	157	189
30	Veracruz	653	786
31	Yucatan	159	0
32	Zacatecas	284	221
	Total	12306	6652
	Total	18958	

Fourth, the IES makes explicit allowance for own-consumption. For each of the 14 expenditure categories considered (food, transportation, clothing, housing, medicines, etc.) data was gathered to evaluate the monetary value of consumption from household own production, and from non-monetary payments and gifts. The sum total of monetary expenditures plus the monetary equivalent of own-consumption and gifts was considered as total expenditure. Unfortunately, I had no information to divide the total monetary value of own-consumption into its components. Thus I am able to rank households on the basis of total expenditures, but not on the basis of total food expenditures[25].

Fifth, as is generally the case with most IES, income seems to be underreported[26]. This, together with consumption smoothing considerations, propelled me to use total expenditures rather than reported income as the relevant variable (including, as just mentioned, the monetary value of own-consumption). Thus, while for expositional convenience in the paper I refer to the variable y_i as total income, the reader should have in mind that total expenditures is the proxy variable used.

Two adjustments were made to the data. The first concerns inflation. 1984 was a period of substantial inflation in Mexico (49.5% according to the CPI), implying that average nominal values of income and expenditure for the beginning of the year were lower than for the end of the year. This generates the need for a correction. Fortunately, the IES included information on the date on which a household was surveyed, allowing me to apply appropriate deflators to express all monetary flows in prices of January of 1984[27].

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[25]Differently put, if y_i and y^f_i is total expenditures and total food expenditures (including own-consumption) of the ith household, respectively, I can obtain $f(y)$ but not $f(y^f)$. While clearly $f(y) \geq f(y^f)$, the difference between the two increases with income given less than unitary food expenditure elasticities.

[26]In particular, total expenditure exceeds total income for the lowest 16 out of the 20 household groups (ordered by per capita household income; see below).

[27]The IES divided the year into 36 intervals of 10 days, and recorded the interval in which a household was surveyed. I divided the Banco the Mexico national monthly consumer price index for 1984 into three components (assuming a linear trend within each ten day period), constructed a price series for the year with 36 observations, and made the base for mid-January 1984 = 1.00. All nominal variables were then converted into prices of mid-January 1984 using the respective date and corresponding price index.

The second adjustment concerns the unit of observation. Data was collected for the household, but information was also available on household size (i.e., number of members in each household). Since household size is not the same across income levels, a measurement based on household income is an inaccurate reflection of individual poverty (cf. Anand, 1983, pp. 63-7). Moreover, since lower income households are larger (see table 3 below), estimates based on household incomes underestimate poverty[28]. To correct for this phenomenon, I rank households on the basis of per capita household income, obtained by dividing the income level of each household by household size, and measure poverty at the level of the individual.

One final remark. Although the IES has very detailed coverage of expenditures, with special emphasis on food, it provides no information on asset ownership or ethnic characteristics[29]. Thus, while the information is very valuable, it is insufficient to make direct connections between income and expenditure patterns, on the one hand, and asset ownership and productive activity, on the other. In particular, it is important to know whether agricultural workers' income levels are correlated with type of crop (cereals vs. other; within cereals corn vs. wheat, etc.), or with type of land tenure (ejido vs. private land). This information is essential to test hypotheses on the relationship between poverty, crop pattern and land tenure status.

IV.1.B. The Lines of Moderate and Extreme-Poverty.

My departure point for constructing z and $\bar{z}$ is the Coplamar (1983) study on basic needs, where the annual cost of a basket of necessities for an average family of 4.9 members, made up of 2.7 adults (older than 15 years of age), 1.66 children (between 3 and 14 years of age) and 0.47 babies is calculated. Coplamar followed a three part procedure to construct this

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[28]Consider households A and B with, say, household incomes 2 and 4 (pesos) and household size 1 and 3, respectively. Ranked by household income household A is poorer, but ranked by per capita household income household B is poorer. As table 3 below shows, there are substantial differences in household size across income levels in Mexico, so that reference to the 'average family' may for some purposes be quite misleading.

[29]A potentially important issue of poverty in Mexico concerns the fact that some poor families belong to indigenous communities; for some of them language and other dimensions may be barriers to income growth.

basket, labelled the 'Canasta Normativa de Satisfactores Esenciales', CNSE. First, it used the expenditure patterns of households in the seventh income decile of the 1977 IES. Second, it added a few goods deemed essential considering "..the rights that the national laws grant to the population, their expectations and the objective necessities that society imposes .." (Coplamar, 1983, p. 133; my translation and emphasis, S.L.). Third, the costs of food and housing were obtained from separate studies also elaborated by Coplamar (1985a, 1985b). In particular, the food component consisted of two parts: (i) the cost of a basket of food that satisfied exogenously given nutritional requirements, and (ii) the cost of additional food items also consumed by households in the seventh decile. The nutritional food basket was labelled the 'Canasta Normativa Alimentaria', CNA, and is composed of 34 food items that satisfy a minimum of 2082 calories and 35.1 grams of protein per day for an adult. In fact, Coplamar constructed fifteen different baskets that satisfied the minimum requirements of calories and proteins, but varied in the number of food items included and the origins of the nutrients (animal vs. vegetal)[30]. The chosen CNA was not the least cost diet, exceeding the minimum by 36% (Coplamar, 1985a, pp. 102-12).

The Coplamar study did not distinguish between moderate and extreme-poverty, although other studies (e.g. Hernandez Laos, 1989a) have taken a subset of the CNSE to construct a Canasta Sub-Minima, CSM, to set a line of extreme-poverty (thus interpreting the CNSE as the line of moderate-poverty). On the other hand, the Coplamar study distinguished between an urban and a rural basket, but found insignificant cost differences so that only one basket was used for the whole population (op. cit., p. 146).

In this paper I follow a mixed procedure to construct z and $\bar{z}$. Consider first the line of extreme-poverty. In principle this line is given by the cost of the nutritional basket, and the extremely poor are those whose food expenditures are below this cost: these are the individuals who lack 'access to adequate sources of nutrition'. (Differently put, given their preferences and the information at their disposal, the extremely-poor maximize welfare allocating their income across different goods; if the endogenously determined food demanded is less then the nutritional minimum, the individual is

[30]The linear program reached different optimal points because the number of variables (food items) and the number of contraints (mix of foods) was changed in different solutions.

classified as extremely-poor.) But as mentioned in the previous section, because own-consumption cannot be separated into its components, I can only rank households by total expenditures, y_i, and not by total food expenditures, y^f_i. This requires that an indirect procedure be followed. Because $y_i \geq y^f_i$, a comparison of the monetary costs of the nutritional basket with y_i would underestimate poverty. As a result, it is necessary to scale-up the cost of the nutritional basket, and I do so by 25%[31,32]. The resulting line of extreme-poverty, $\underline{z}$, can then be compared against the distribution of total expenditures f(y) to identify the extremely poor. On the other hand, I simply take the monetary cost of the CNSE as $\bar{z}$[33]. (From my subjective point of view this is somewhat too high. But because I do not propose any specific policy measures based on this line, I do not pursue the point further.) Table 2 summarizes these calculations.

One final remark. It is clear that the procedure used in this and other papers to set both $\underline{z}$ and $\bar{z}$ involve some arbitrariness. Yet, only if there is general consensus on these poverty lines can measurements be widely accepted and used to monitor progress in poverty alleviation. Further discussion on the values for $\underline{z}$ and $\bar{z}$ by policy makers and others concerned with poverty alleviation would be called for.

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[31]This procedure can be rationalized assuming that there is an irreducible minimum of expenditures that must be allocated to non-food items. Streeten (1989b) and Lipton (1988a) present evidence to show that this minimum is around 20%, implying a 'scaling factor' of 1.25. It should be clear that this procedure, while plausible, is somewhat arbitrary, since expenditure shares on different goods are endogenous. One can conceive of situations where households do not purchase sufficient food to satisfy a nutritional requirement, but still allocate less then 80% of total expenditures to food. To avoid this arbitrariness, further work needs to separate the components of own-consumption to obtain $f(y^f)$, and include only the monetary cost of the nutritional basket in $\underline{z}$.

[32]My line of extreme-poverty differs from the one used in other studies. For example, Hernandez Laos also defines households in extreme poverty "..as those households that have such a small income that, even if it was all allocated to food, would not allow them to satisfy their nutritional needs" (1989a, p. 2; my translation, S.L.). But his Canasta Sub-Minima is composed as follows: 55% food, 35% housing, 8.5% health and 1.5% education.

[33]Since the CNSE was expressed in prices of March of 1982, I use the respective components of the national monthly consumer price index to express the cost of the basket in prices of January of 1984; see table 2.

Table 2

Lines of Moderate and Extreme-Poverty

List of Necessities	Monetary Cost	
	Moderate Poverty	Extreme-Poverty
1. Food		
1.1 nutritional basket (Canasta Normativa Alimentaria)	41,863	41,863
1.2 other food consumed at home	14,073	-
1.3 food consumed outside home	6,680	-
1.4 eating & preparation utensils	6,398	-
2. Housing		
2.1 maintenance & depreciation	12,237	-
2.2 financial amortization	28,342	-
2.3 water & electricity	4,498	-
2.4 real estate taxes	1,800	-
2.5 furniture, blankets and similar	4,576	-
3. Health		
3.1 Medicines	527	-
3.2 House and personal cleaning	9,108	-
4. Education		
4.1 tuition	791	-
4.2 school materials	1,287	-
5. Culture and Entertainment		
5.1 books	6,403	-
5.2 movies, vacation and similar	24,516	-
5.3 radio, T.V., and similar	3,679	-
6. Transport and Communication		
6.1 transport	10,107	-
6.2 mail and phone	224	-

(continued)

(table 2 continued)

7. Clothing		
7.1 clothing	26,020	-
7.2 shoes	6,270	-
7.3 belts, bags and similar	355	-
8. Personal Needs		
8.1 shaving materials, deodorants and similar	4,840	-
8.2 items for the house	128	-
8.3 legal and other services	411	-
Total in prices of March 1982	215,133	41,863
(25% expansion factor for extreme-poverty)	-	52,328
Total in prices of January 1984	635,512	151,753
Total per trimester (*.25)	158,878	37,938
Total per capita (*1/4.9) =		
Poverty lines	32,424	7,742

Source: For the line of moderate poverty Coplamar (1983); for the line of extreme-poverty own construction.

IV.2 Socioeconomic Characteristics of Households.

I turn to briefly discuss households' demographic (table 3), expenditure (table 4), income (table 5) and occupational characteristics (table 6). At this point I simply describe some 'stylized facts'; section VI links these facts to behavior and policies for the poor. To accomplish this, households are classified by location and income level. In particular, 20 groups of households are constructed in intervals of 5% of the total sample (so that each interval contains 948 households) ordered by per capita household income and, within each group, households are divided into urban and rural.

I make five observations on table 3. One, there are sharp differences in household size across income levels, but not along rural-urban lines. Poorer households are significantly larger than the average[34]. Two, poorer households have both a larger absolute number of children (individuals under 12 years of age) and a larger proportion of children in the household. Three, poorer households have a smaller share of income earners. Differently put, the dependency ratio -the number of people who do not work over total household size- is highest for poorer households; differences in this ratio between the poorest and the richest households are dramatic. Four, average education of the household head increases steadily with income, and within each household group is always higher for urban households[35]. Five, there appears to be no systematic relationship between the share of households headed by females and either income or location.

Turn to allocation of expenditures and sources of income. Table 4 reveals that: one, even for the poorest households the share of monetary

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[34]The sample contained a total of 96,380 individuals, giving an average household size of 5.08.

[35]The IES reports education for the household head as a discrete variable between 0 and 10 with the following values: 0, no schooling; 1, finished first year of primary education; 2, between two and five years of primary education; 3, finished primary education; 4, incomplete secondary education; 5, finished secondary education; 6, unfinished high-school or vocational education; 7, finished high-school or vocational education; 8, unfinished university education; 9, completed university education; 10, master's or doctoral education. The figures reported in table 3 are obtained by taking simple averages of this value for household heads in each household group.

Table 3

Demographic Characteristics of Households

Household Group*	Proportion of Households	Proportion of Female Headed Households	Average Education of Household Head	Average Household Size	Average Number of Children	Share of Children	Share of Earners
1 Urban	0.210	0.160	1.345	7.59	3.49	0.459	0.211
Rural	0.789	0.065	1.081	7.11	3.25	0.457	0.208
2 Urban	0.345	0.100	1.756	7.52	3.26	0.433	0.229
Rural	0.654	0.077	1.229	6.65	2.88	0.432	0.234
3 Urban	0.381	0.104	1.613	7.00	3.04	0.434	0.229
Rural	0.618	0.090	1.549	6.25	2.73	0.437	0.239
4 Urban	0.430	0.125	1.853	6.87	2.71	0.395	0.242
Rural	0.569	0.085	1.418	5.89	2.38	0.405	0.261
5 Urban	0.485	0.152	2.026	6.37	2.42	0.380	0.261
Rural	0.514	0.092	1.539	5.84	2.20	0.376	0.279
6 Urban	0.564	0.142	2.190	6.40	2.46	0.384	0.267
Rural	0.435	0.118	1.479	5.59	2.06	0.368	0.281
7 Urban	0.604	0.165	2.209	5.87	2.06	0.352	0.282
Rural	0.395	0.141	1.776	5.22	1.89	0.362	0.295
8 Urban	0.659	0.147	2.481	5.98	1.99	0.333	0.284
Rural	0.340	0.148	1.783	5.07	1.61	0.318	0.308
9 Urban	0.666	0.120	2.625	5.51	1.84	0.334	0.301
Rural	0.333	0.123	1.974	5.03	1.69	0.336	0.288
10 Urban	0.683	0.120	2.683	5.58	1.83	0.328	0.302
Rural	0.316	0.143	2.000	4.61	1.47	0.319	0.314
11 Urban	0.706	0.140	2.817	5.21	1.62	0.310	0.310
Rural	0.293	0.143	2.287	4.41	1.33	0.302	0.331

(continued)

(table 3, continued)

12	Urban	0.699	0.144	3.126	5.03	1.52	0.303	0.324
	Rural	0.300	0.136	2.375	4.49	1.38	0.308	0.314
13	Urban	0.746	0.156	3.124	4.79	1.34	0.279	0.340
	Rural	0.253	0.212	2.133	3.86	1.06	0.276	0.360
14	Urban	0.787	0.152	3.293	4.71	1.23	0.262	0.352
	Rural	0.212	0.189	2.413	3.99	0.88	0.220	0.369
15	Urban	0.792	0.167	3.584	4.46	1.13	0.253	0.366
	Rural	0.207	0.223	2.568	3.60	0.86	0.239	0.405
16	Urban	0.810	0.179	3.865	4.32	1.09	0.251	0.397
	Rural	0.189	0.161	2.733	3.42	0.72	0.210	0.440
17	Urban	0.848	0.199	4.107	3.86	0.92	0.238	0.417
	Rural	0.151	0.215	2.784	3.41	0.83	0.243	0.426
18	Urban	0.828	0.201	4.592	3.55	0.81	0.227	0.460
	Rural	0.172	0.159	3.073	3.14	0.76	0.243	0.444
19	Urban	0.858	0.218	4.926	3.29	0.71	0.217	0.482
	Rural	0.141	0.201	3.425	2.71	0.44	0.162	0.534
20	Urban	0.872	0.225	6.006	2.68	0.53	0.199	0.571
	Rural	0.128	0.173	4.735	2.47	0.35	0.224	0.498

* Households are grouped in twenty intervals with 5% of the sample each, and are ranked by increasing household per capita income.

Table 4

Allocation of Monetary Expenditures*

Household Group	Food & Beverages	Clothing & Shoes	Housing	Transport & Communication	Education	Other
1 Urban	0.61404	0.05759	0.09506	0.04298	0.03446	0.15584
Rural	0.59666	0.07961	0.07092	0.03731	0.02526	0.19021
2 Urban	0.60266	0.07403	0.08724	0.05445	0.03428	0.14732
Rural	0.61258	0.08463	0.06126	0.04384	0.03044	0.16723
3 Urban	0.59726	0.07278	0.09225	0.06436	0.03812	0.13521
Rural	0.60959	0.08064	0.06420	0.05734	0.03043	0.15776
4 Urban	0.60074	0.06208	0.08977	0.06828	0.04503	0.13408
Rural	0.61080	0.07867	0.06060	0.05957	0.03262	0.15771
5 Urban	0.59481	0.07332	0.08231	0.06776	0.05096	0.13082
Rural	0.58500	0.09581	0.05482	0.06535	0.03735	0.16164
6 Urban	0.58582	0.08108	0.08098	0.07270	0.04767	0.13172
Rural	0.59812	0.09331	0.05295	0.06690	0.03774	0.15096
7 Urban	0.58817	0.06964	0.08489	0.07239	0.04736	0.13752
Rural	0.58669	0.09861	0.05675	0.06787	0.03651	0.15354
8 Urban	0.56718	0.07443	0.08308	0.08314	0.05526	0.13689
Rural	0.57297	0.10126	0.05506	0.07198	0.04119	0.15752
9 Urban	0.55899	0.08052	0.08410	0.08107	0.05622	0.13907
Rural	0.54828	0.09428	0.05130	0.09895	0.04017	0.16699
10 Urban	0.56468	0.08409	0.08123	0.07907	0.05403	0.13688
Rural	0.55209	0.10872	0.05090	0.08173	0.04041	0.16612
11 Urban	0.54973	0.08913	0.07413	0.09044	0.05882	0.13771
Rural	0.54146	0.10080	0.06053	0.08932	0.04015	0.16771

(continued)

(table 4, continued)

12	Urban	0.53467	0.08617	0.07905	0.09717	0.05871	0.14420
	Rural	0.51974	0.09365	0.05317	0.10534	0.04541	0.18267
13	Urban	0.51844	0.08655	0.08225	0.10438	0.06200	0.14635
	Rural	0.50851	0.09424	0.04766	0.11714	0.04507	0.18734
14	Urban	0.50327	0.08745	0.07579	0.12288	0.06608	0.14450
	Rural	0.50566	0.09567	0.05574	0.11322	0.06765	0.16205
15	Urban	0.47749	0.09143	0.08027	0.12754	0.07006	0.15319
	Rural	0.48534	0.10312	0.05339	0.12411	0.05173	0.18228
16	Urban	0.46976	0.09627	0.07827	0.12567	0.06853	0.16148
	Rural	0.46577	0.09507	0.04932	0.16346	0.04449	0.18187
17	Urban	0.44086	0.08867	0.08093	0.14422	0.07586	0.16944
	Rural	0.45166	0.10298	0.04727	0.12743	0.07317	0.19746
18	Urban	0.39871	0.09516	0.08113	0.15021	0.08896	0.18580
	Rural	0.38918	0.10652	0.04011	0.17169	0.05148	0.24100
19	Urban	0.35585	0.09145	0.07498	0.18310	0.09644	0.19815
	Rural	0.35983	0.09311	0.04136	0.16189	0.07408	0.26970
20	Urban	0.26344	0.07463	0.06881	0.23970	0.10353	0.24986
	Rural	0.22459	0.06447	0.02755	0.36034	0.04499	0.27804

* Rows add up to 100% except for rounding errors.

expenditures devoted to food and beverages is around 60%[36]. Two, even at the lowest income levels a significant portion of expenditures (between 15 and 20%) is allocated to items other than food, shelter and clothing. Three, as expected, the food share declines as income increases. Table 5 shows that: one, in each household group mean household income is always lower for rural households. Two, for all groups a significant share of income derives from 'imputed' sources although, as noted, its nature is probably quite different for each group. Three, transfers -which in the IES include migrant remittances- are a relatively less important source of income for the poorest households. Four, income from own business is, in each household group, relatively more important for rural than urban households. Conversely, in each household group wage income is relatively more important for urban than rural households. Since the majority of the poorest households are rural (table 7 below), it becomes clear that wage income is not the most important source of earnings for the poorest groups.

Finally, table 6 shows that: one, the largest number of the poorest head of households work as self employed in the rural areas (almost 40%), with the next category being agricultural worker (21%)[37]. Although there is no direct information, self employed workers in the rural areas are most probably small scale agricultural producers (but note that other activities like handicrafts are also included here); hence, even owners of some land are among the very poor. Two, if we take the lowest three household groups as constituting the extremely-poor (see section IV.3 below), and if we take self employment and employers with one to five employees in the rural areas to be mostly small scale agriculture[38], and add to this agricultural workers, then 63% of all

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[36]I note here that to construct this table only monetary expenditures are considered since, as noted, information on the components of own-consumption was not available. As can be seen from table 5 below, all household groups show a significant share for imputed income (the income equivalent of own consumption). For the poor it may be non-marketed food grown by them; for the rich it may be the use of a company car. Thus, the poorest groups may consume more food than what they purchase. The importance of this resides on the potential impact of food subsidies: to the extent that not all food consumed by the poor is purchased, the effectiveness of food subsidies is diminished; see the discussion in section VI.4.

[37]For each household group the rows of urban and rural add up to 100%.

[38]Recall that the IES did not report a separate category for ejidatarios. I assume here that employers with one to five employees in the rural areas are either ejidatarios or are also involved in some agricultural activity.

Table 5

Income Sources of Households*

Household Group	Imputed**	Wages	Own Business	Property Income	Coopera-tives	Transfers	Other	Mean*** Income
1 Urban	0.167	0.532	0.252	0.003	0.000	0.044	0.000	41,531
Rural	0.240	0.345	0.364	0.001	0.001	0.047	0.000	36,630
2 Urban	0.146	0.566	0.214	0.006	0.006	0.059	0.001	58,133
Rural	0.231	0.374	0.339	0.004	0.002	0.049	0.000	48,859
3 Urban	0.133	0.588	0.234	0.004	0.004	0.035	0.000	63,473
Rural	0.227	0.357	0.355	0.006	0.001	0.051	0.001	54,723
4 Urban	0.149	0.542	0.249	0.004	0.002	0.052	0.000	72,306
Rural	0.213	0.381	0.326	0.011	0.001	0.066	0.000	58,217
5 Urban	0.142	0.581	0.214	0.010	0.002	0.048	0.000	79,417
Rural	0.215	0.346	0.342	0.007	0.004	0.083	0.002	69,464
6 Urban	0.144	0.614	0.185	0.007	0.009	0.037	0.001	86,078
Rural	0.207	0.405	0.311	0.008	0.003	0.064	0.002	70,891
7 Urban	0.154	0.562	0.217	0.008	0.005	0.052	0.000	90,186
Rural	0.190	0.373	0.342	0.007	0.001	0.085	0.000	76,109
8 Urban	0.161	0.572	0.212	0.005	0.000	0.046	0.002	104,876
Rural	0.174	0.356	0.388	0.005	0.002	0.073	0.000	91,531
9 Urban	0.157	0.601	0.174	0.014	0.003	0.042	0.005	104,896
Rural	0.184	0.329	0.404	0.014	0.016	0.047	0.005	90,563
10 Urban	0.161	0.585	0.186	0.009	0.000	0.055	0.003	114,270
Rural	0.182	0.385	0.318	0.027	0.004	0.081	0.000	90,279
11 Urban	0.167	0.563	0.194	0.010	0.005	0.057	0.002	120,046
Rural	0.207	0.413	0.308	0.010	0.001	0.058	0.001	97,343

(continued)

(table 5, continued)

12	Urban	0.168	0.589	0.169	0.014	0.002	0.055	0.002	127,215
	Rural	0.196	0.367	0.343	0.014	0.006	0.071	0.000	106,920
13	Urban	0.192	0.576	0.166	0.015	0.000	0.048	0.001	131,448
	Rural	0.209	0.292	0.396	0.009	0.001	0.090	0.001	110,084
14	Urban	0.195	0.536	0.193	0.012	0.002	0.058	0.002	149,820
	Rural	0.185	0.382	0.368	0.023	0.000	0.040	0.001	122,989
15	Urban	0.191	0.562	0.175	0.018	0.006	0.044	0.003	160,323
	Rural	0.186	0.410	0.281	0.009	0.018	0.095	0.000	124,833
16	Urban	0.199	0.563	0.151	0.025	0.001	0.055	0.004	178,959
	Rural	0.180	0.369	0.351	0.029	0.000	0.064	0.006	136,712
17	Urban	0.212	0.539	0.152	0.022	0.000	0.069	0.004	186,883
	Rural	0.192	0.350	0.315	0.038	0.016	0.086	0.001	164,343
18	Urban	0.204	0.512	0.182	0.032	0.002	0.063	0.004	211,614
	Rural	0.219	0.342	0.304	0.030	0.001	0.092	0.010	189,852
19	Urban	0.217	0.535	0.141	0.029	0.001	0.065	0.012	249,924
	Rural	0.242	0.378	0.249	0.038	0.000	0.089	0.004	207,328
20	Urban	0.238	0.443	0.159	0.078	0.001	0.064	0.016	385,978
	Rural	0.173	0.256	0.394	0.055	0.001	0.084	0.037	330,926

* Within each household group income shares for urban and rural add up to 100% except for rounding errors.

** Imputed income is the monetary equivalent of own-consumption and gifts; see text.

*** For a trimester, measured in pesos of January of 1984.

Table 6

Occupational Characteristics of Household Heads*

Household Group	un-employed	non-agri-cultural worker	agri-cultural worker	Employer with 1 to 5 employees	Employer with > 6 employees	self-employed	non-remunerated worker	member of cooperative
1 Urban	0.032	0.063	0.043	0.001	0.000	0.069	0.001	0.000
Rural	0.075	0.072	0.215	0.028	0.004	0.393	0.001	0.000
2 Urban	0.048	0.135	0.043	0.006	0.000	0.104	0.003	0.005
Rural	0.063	0.087	0.165	0.029	0.007	0.298	0.000	0.002
3 Urban	0.040	0.160	0.064	0.003	0.001	0.110	0.001	0.001
Rural	0.062	0.094	0.137	0.026	0.008	0.290	0.000	0.000
4 Urban	0.059	0.182	0.046	0.009	0.000	0.131	0.001	0.001
Rural	0.069	0.104	0.120	0.022	0.002	0.248	0.002	0.001
5 Urban	0.083	0.222	0.050	0.008	0.001	0.118	0.001	0.000
Rural	0.065	0.095	0.112	0.028	0.007	0.203	0.001	0.002
6 Urban	0.066	0.286	0.057	0.005	0.001	0.145	0.000	0.003
Rural	0.055	0.091	0.088	0.021	0.004	0.172	0.003	0.001
7 Urban	0.096	0.304	0.034	0.014	0.000	0.152	0.001	0.003
Rural	0.047	0.082	0.063	0.025	0.000	0.173	0.003	0.001
8 Urban	0.104	0.342	0.033	0.023	0.003	0.151	0.002	0.000
Rural	0.042	0.085	0.048	0.019	0.006	0.139	0.000	0.000
9 Urban	0.097	0.375	0.025	0.022	0.001	0.141	0.002	0.002
Rural	0.042	0.073	0.049	0.013	0.000	0.149	0.001	0.004
10 Urban	0.120	0.375	0.030	0.015	0.001	0.140	0.001	0.000
Rural	0.049	0.088	0.054	0.017	0.001	0.099	0.003	0.003

(continued)

(table 6, continued)

11	Urban	0.095	0.406	0.021	0.027	0.001	0.152	0.001	0.003
	Rural	0.040	0.091	0.040	0.016	0.003	0.100	0.003	0.000
12	Urban	0.097	0.425	0.017	0.020	0.004	0.132	0.002	0.002
	Rural	0.052	0.086	0.031	0.009	0.002	0.115	0.001	0.002
13	Urban	0.114	0.441	0.014	0.021	0.003	0.148	0.004	0.000
	Rural	0.042	0.054	0.029	0.022	0.003	0.099	0.002	0.000
14	Urban	0.117	0.443	0.021	0.023	0.003	0.174	0.005	0.001
	Rural	0.037	0.064	0.016	0.021	0.003	0.068	0.001	0.000
15	Urban	0.138	0.436	0.012	0.029	0.005	0.161	0.004	0.004
	Rural	0.035	0.067	0.013	0.010	0.002	0.075	0.002	0.001
16	Urban	0.149	0.488	0.010	0.033	0.002	0.122	0.003	0.000
	Rural	0.036	0.050	0.016	0.016	0.002	0.069	0.001	0.000
17	Urban	0.169	0.508	0.007	0.041	0.002	0.116	0.003	0.000
	Rural	0.040	0.046	0.005	0.011	0.004	0.041	0.000	0.003
18	Urban	0.158	0.466	0.008	0.046	0.005	0.138	0.002	0.003
	Rural	0.036	0.055	0.010	0.018	0.003	0.047	0.001	0.001
19	Urban	0.178	0.517	0.009	0.037	0.004	0.107	0.005	0.001
	Rural	0.031	0.049	0.009	0.011	0.002	0.037	0.000	0.000
20	Urban	0.160	0.563	0.006	0.045	0.021	0.072	0.002	0.001
	Rural	0.017	0.049	0.005	0.017	0.007	0.029	0.001	0.001

* Share of total household heads in each occupational category; within each household group shares add up to 100% except for rounding errors.

extremely-poor household heads are principally engaged in agriculture[39]. Three, while the urban poor constitute the minority of the extremely-poor (31% of the three lowest household groups), their main occupation is either as non-agricultural workers or self-employed (28%).

IV.3 Estimates of Moderate and Extreme-Poverty.

Poverty indices $P_j(\alpha,z)$ for $\alpha = 0,1,2$, $z = \underline{z}, \bar{z}$ and j = rural, urban are presented in tables 7 and 8[40]. Consider first panel (a) of table 7. When $\alpha = 0$ I find, first, that 19.5% of the sample population could be classified as extremely-poor. Second, that 37% of the rural population is below the line of extreme-poverty, while only 9.9% of the urban population falls in this category. Given the respective share of each population in the sample total, this implies that the rural areas account for almost 67% of national extreme-poverty. Based on the head count ratio, extreme-poverty is mostly a rural problem. When correction is made for the depth of poverty, $\alpha = 1$, the proportion of extreme-poverty accounted for by the rural population increases to 72.8%. Finally, when account is made of the distribution of poverty, $\alpha = 2$, the proportion of extreme-poverty accounted for by rural groups increases to 76.6%. The fact that the share of rural extremely-poor increases with higher order indices illustrates that not only is extreme-poverty mostly a rural phenomenon, but the poorest of the extremely-poor are almost all in the rural areas[41]. (The significance of this is highlighted recalling that in Mexico more than two thirds of the population can be classified as urban.) It also illustrates the importance of appropriate weighting and the misleading

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[39]Table 6 refers to the main occupation of the household head during the month in which the household was surveyed. To the extent that household heads may migrate between urban and rural locations with the agricultural cycle these results may be misleading. In addition, micro studies for poor land owning households show a diversification of income sources, with some earnings coming from off-farm labor (cf. Roberts (1982)), section V.1 below). Also note that household heads that report to be unemployed were so with reference to that month only, so that these figures cannot be used to properly assess unemployment status.

[40]The distinction between $P[\alpha,\underline{z}(C)]$ and $P[\alpha,\underline{z}(M)]$ found in table 7 is explained below; at this point the discussion focuses on $P[\alpha,\underline{z}(C)]$.

[41]In fact, one could argue that table 7 underestimates rural poverty to the extent that some publicly provided services, whose effect on poverty is not captured by the values of $P_j(.)$, are relatively more available in urban areas; see footnote 44 below.

Table 7

Indices of Extreme-Poverty

Panel (a): CNA recommended by Coplamar, $\underline{z}(C)$.

	$\alpha = 0$		$\alpha = 1$		$\alpha = 2$	
	P_j	T_j	P_j	T_j	P_j	T_j
Rural	0.3719	0.6689	0.1232	0.7280	0.0572	0.7658
Urban	0.0995	0.3311	0.0248	0.2720	0.0094	0.2342
National	0.1951	1.0000	0.0594	1.0000	0.0262	1.0000

Panel (b): Minimum Cost CNA, $\underline{z}(M)$.

	$\alpha = 0$		$\alpha = 1$		$\alpha = 2$	
	P_j	T_j	P_j	T_j	P_j	T_j
Rural	0.2113	0.7357	0.0617	0.7875	0.0266	0.8124
Urban	0.0410	0.2643	0.0090	0.2125	0.0033	0.1876
National	0.1008	1.0000	0.0275	1.0000	0.0115	1.0000

Table 8

Indices of Moderate-Poverty.

	$\alpha = 0$		$\alpha = 1$		$\alpha = 2$	
	P_j	T_j	P_j	T_j	P_j	T_j
Rural	0.9667	0.4178	0.6351	0.4860	0.4662	0.5307
Urban	0.7281	0.5822	0.3631	0.5140	0.2195	0.4693
National	0.8119	1.0000	0.4586	1.0000	0.3037	1.0000

picture that can be obtained from the simple head-count ratio: at least in the case of Mexico there are sharp differences in the level of poverty among the extremely-poor.

It is important to note that for four reasons the above measures overestimate extreme-poverty. One, the estimate of $\underline{z}$ took as a basis the CNA recommended by Coplamar. But as already remarked, this CNA, denoted CNA(C), is not the least cost diet to give 2,082 calories and 35.1 grams of protein per day. If instead the 'true' minimum cost CNA, denoted CNA(M), is used as the basis for computing $\underline{z}$ I obtain, $P[0,\underline{z}(M)] = 0.1008$, with 73.5% of this poverty total accounted for by the rural population; see panel (b) of table 7. More generally, given a value for α, as $\underline{z}$ falls the share of extreme-poverty accounted for by the rural population increases. This suggests that: first, $P[\alpha,\underline{z}(C)]$ and $P[\alpha,\underline{z}(M)]$ should be interpreted as upper and lower bounds on the indices of extreme-poverty, respectively, with the 'quality' (in terms of food variety and perhaps palatability) of the diet that satisfies the same nutritional requirement decreasing as we move from CNA(C) to CNA(M)[42]. Second, that while there is some uncertainty determining the exact proportion of the population that is extremely-poor, the proposition that extreme-poverty is fundamentally a rural phenomenon is very robust.

Two, the above measures of individual poverty are based on per capita household income, and while as seen above poorer households are larger, they also have a greater proportion of children, requiring a conversion into adult equivalent income levels. Three, the existence of economies of scale in consumption reduces income requirements for larger households (cf. Behrman and Wolfe (1984)). Four, finally, only sample data was used for the estimates of $P(\alpha,\underline{z})$. But since the total value of consumption expenditures implicit in the IES is lower than the corresponding figure of the national accounts, this could bias the results upwards (assuming the national accounts are closer to the 'true' expenditure totals). No correction was introduced for this factor since I had no information to distribute the discrepancy across income

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[42]The CNA(C) costs 6,193.00 pesos per capita per trimester, so that $\underline{z}(C)$ equals 7,742 pesos; the CNA(M) costs only 4,554.10, so that $\underline{z}(M)$ equals 5,692 pesos. On the other hand, if we assume that for the lowest deciles of the population all own-consumption consists of food, the implied share of expenditures allocated to food would be 70%. Multiplying CNA(M) by 1/0.70 gives a line of extreme-poverty of 6,505.85, which is still 19% below $\underline{z}(C)$.

levels[43]. Aside from this potential for overestimation, there is an additional source of bias in the measurements that arises from differences in relative prices across regions, since in these circumstances the same monetary income may translate into different consumption levels[44]. It is left for further research to determine how significant these omissions are.

I emphasize that a value for $P[0,\underline{z}(C)]$ of 0.19 does not imply that in 1984 19% of the population was undernourished. As discussed in section III.2, measurements of undernutrition based on requirement-intake comparisons fail to correct for intra and inter-individual variability in nutrient requirements. In addition, the diet implicit in the monetary value for $\underline{z}(C)$ need not coincide with a freely chosen diet: even if an individual is given a monetary income of $\underline{z}(C)$ there is no guarantee that he will in fact spend 80% of it on food and that, in addition, the food chosen will have a composition equal to CNA(C). Moreover, note that an equally nutritious diet but with a different composition, CNA(M), gives substantially lower estimates of extreme-poverty. Of course, although table 7 provides no direct evidence, the presumption is that the individuals below $\underline{z}(C)$ are in fact those that have the highest probability of being undernourished, are more vulnerable to disease, and suffer from anthropometric deficiencies, with this probability increasing as incomes fall further below $\underline{z}(C)$. Until additional evidence of undernutrition is available, these are the individuals who policy makers must assume are most in need. Additionally, it is clear that these individuals do behave differently, particularly with regards to key variables like fertility, household size and dependency ratios.

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[43]One could argue that since the IES paid particular attention to food expenditures and own-consumption, it is likely that most of the under-reporting occured at higher income levels. Since $P(\alpha,\underline{z})$ only requires information on the distribution of income up to $\underline{z}$, it follows that the potential for upward bias arising from this factor is not too significant, however.

[44]An example of this is the provision of water for the inhabitants of Mexico City and those of surrounding poor neighborhoods (like Ciudad Netzahualcoyotl): the former get it free, while the latter must pay for its delivery. Solis (1984) presents evidence to show that, on average, prices in Mexico are higher in remote rural regions compared to urban. Greer and Thorbecke (1986a,b) have developed a simple methodology that allows to compute the regional monetary cost, $\underline{z}_j$ (j=1,2,...m), of a freely chosen diet (i.e., given individual preferences) that has the same caloric content in a context where there is regional price variation. In this case the monetary poverty line varies across regions, although the underlying reference to the level of nutritional poverty is the same.

Table 8 presents the values for $P(\alpha, \bar{z})$. I note, first, that if the CNSE is accepted as the appropriate reference point, 81.2% of the population (and 72.8% of all households) would be classified as moderately-poor. While, as argued in section III.1, moderate-poverty is a subjective concept, such a large number calls into question the components of the CNSE (and of other studies that have also used the CNSE as a reference point)[45]. Second, when $\alpha = 0$ I find that the urban areas now account for the largest share (58%) of national poverty. When $\alpha = 2$ these proportions are reversed, with the rural areas accounting for 53% of moderate-poverty. As with extreme-poverty, when account is taken of the depth and distribution of moderate-poverty the rural areas come to the forefront.

To sum up, based on the 1984 IES: (i) at most 19% of the population was below the line of extreme-poverty, although it is probably the case that this is an over-estimate, (ii) the extremely-poor are mostly located in rural areas, (iii) the poorest of the extremely-poor are also found mostly in rural areas, (iv) the extremely-poor have very large families, have the largest share of children, the highest dependency ratio and the lowest educational levels, (v) not even the extremely-poor allocate more than 60% of total monetary expenditures to food, (vi) most of the extremely-poor are in agricultural activities, (vii) the urban extremely-poor are relatively better off than the rural, but have similar demographic, expenditure and educational characteristics.

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[45]The complete basket is found in Coplamar, 1983, pp. 134-45; a careful look shows that an important part of the basket is made up of items like refrigerator, T.V., automatic laundry and dry cleaning, vacations and personal entertainment, etc.. Recall that this basket was formed on the basis of the expenditure patterns of the seventh decile; not surprisingly, the value for $P(0,\bar{z})$ calculated on the basis of household incomes is, as mentioned in the text, 0.728.

V. Determinants of Poverty.

This section discusses the determinants of poverty. The central hypothesis is that lagging rural and agricultural development lies at the root of Mexican poverty. Independently of the geographical distribution of the extremely-poor, this hypothesis is important in a behavioral sense: urban poverty is not only quantitatively less important, but is to a large extent a reflection of rural poverty, as migration is a key mechanism through which the rural poor attempt to reduce their income differences vis-a-vis the rest of the population. The poverty profiles of section IV showed that the extremely-poor, aside from being located mostly in the rural areas and having the lowest levels of education, derive most of their earnings from self employment and wage labor, presumably in agriculture and related activities. An obvious implication is that to study the determinants of poverty is to study the determinants of the returns to unskilled labor and land —the main assets owned by the poor[46].

Given preferences, technology and the size and distribution of endowments, the returns to land and to unskilled labor depend on: (i) government policies broadly defined to include pricing, intra and inter-sectoral resource allocation, and (ii) the institutional environment in which agents make their decisions. Given its importance, most of this section is devoted to intra-rural policies, including a brief discussion of the institutional framework (sub-section V.1). However, I also briefly mention inter-sectoral (sub-section V.2) and macroeconomic policies (sub-section V.3).

Two caveats: one, discussing all these issues here involves a substantial risk of over-extending and thinning my arguments. I emphasize that my aim is only to raise some key points and discuss their bearing on poverty; there is

[46]Actually, some of the land exploited by the extremely-poor under the ejido tenure form has important restrictions attached to it, so it should be thought of as a very peculiar asset; see below.

no claim to a complete or systematic analysis[47]. Two, I focus attention in those factors that have characterized the Mexican economy over the last decades, since the current structure of poverty is the cumulative result of past policies. As I point out below, progress has been made in reforming rural regulations, in changing the pattern of subsidies, and in reducing macroeconomic uncertainty. But these changes have only occurred recently, so that their effects on poverty will only be felt in the future.

V.1 Rural and Agricultural Development.

There is a certain paradox in the argument that the root cause of poverty in Mexico lies in the rural areas. The paradox lies in the fact that for a substantial period of time Mexico's agriculture was a success story. Indeed, using the language of Timmer (1988), during the period of 'the agricultural transformation' the agricultural sector in Mexico helped to: ".. (i) increase the supply of food for domestic consumption, (ii) release labor for industrial employment, (iii) enlarge the size of the market for industrial output, (iv) increase the supply of domestic savings, and (v) earn foreign exchange" (op. cit., p. 290). As argued by Yates (1981, p. 7-8), between 1940 and 1965 agricultural output in Mexico increased at an average annual rate of 5.7%; and while the population was growing substantially, output per capita increased over 2% annually during this time.

Various factors account for this magnificent performance, but two need to be singled out: one, there was an increase in the **extensive margin**, with harvested area growing at about 3% annually from 1940 to 1960. Two, technical change generated an increase along the **intensive margin** with yields growing at about 2% annually. Much of the growth in irrigated land occurred in the north

[47]Major research challenges lie in these areas. At the theoretical level it is necessary to develop models that capture the incentive and efficiency effects of the ejido/private land dichotomy. At the empirical level more evidence is needed on the determinants of crop choice, tenancy arrangements and the demand for rural labor. Unfortunately, the data for such analysis is particularly scarce in Mexico. In addition, because some tenancy arrangements are illegal (although apparently common), the quality of the official data is suspect. ("However, given the clandestine renting out of ejido land to private farmers, the census data probably fail to reflect the real distribution of inputs and outputs between the two sectors; this places in doubt any conclusions about relative productivity that are derived from the census data." Heath, 1990, p. v.)

and Northwest, where for geographical reasons public sector investments had higher rates of return; fewer irrigation projects were undertaken in the relatively denser South and Central parts of the country. Rain-fed agriculture, on the other hand, had a much wider growth. Irrigation, the development of high-yielding varieties, and increased use of fertilizers also allowed Northern agriculture to diversify crop choice. Yates, op. cit., estimates that about 1% of agricultural growth was accounted for by specialization according to comparative advantage (i.e., a switch towards higher value crops).

As of the mid-1960's this performance deteriorated, however. Between 1967 and 1980 agricultural output grew at an annual average rate of 2.6%, less than the growth rate of population (around 3.5% at that time); since then agricultural growth has slowed down even more: between 1982 and 1987 output grew 1.6% annually on average. This slowdown is a complex phenomenon but four causes can be singled out. First, the extensive margin was exhausted; harvested area peaked in 1966 (Yates, op. cit., p. 117). Second, public sector investment in irrigation projects diminished, which partly reduced the potential for growth along the intensive margin: only by switching towards higher value crops could agricultural growth be enhanced. Third, the terms of trade between agriculture and industry turned increasingly against agriculture: "..the price/cost relationship began to deteriorate just at a time when it was becoming more expensive per acre to bring additional land into cultivation" (Yates, op. cit., p. 65). Fourth, private investment in agriculture fell. The supply contraction was therefore not caused by weather variations, but by an inelastic supply of land, lower public and private investment, and deteriorated terms of trade.

Aside from price and public investment policies, institutional factors also play a key role. In particular: (i) the land tenure system divides agriculture in two separate forms of tenure, private and ejido agriculture, and (ii) a complex system of regulations applies to the use of land, labor and credit in both types of agriculture. In private agriculture the are limitations to the size of land holdings, so that entry is limited; restrictions apply also to the uses of land[48]. In ejido agriculture land

[48]For example, private farmers may own up to a maximum of 100 hectares of irrigated land, but up to 150 if they grow cotton, and up to 300 if the land is used for coffee, sugarcane, grapes and other fruit trees. They may own more land if it is not irrigated, or if it is used for cattle-grazing. But land used for cattle-grazing cannot be used for crops.

cannot be sold or mortgaged; restrictions apply to the type of labor contracts that can be implemented, and to the sources and uses of credit[49].

A full analysis of these institutions is beyond the scope of this paper but some remarks are necessary since they are key determinants of earnings in the rural areas. I focus attention not only on the ejido-private agriculture dichotomy (which is certainly very important), but also on other regulations that bear on the rural sector. It is this complex of regulations and land tenure institutions that hurts the rural poor. Unfortunately, it is very difficult to discern which individual regulations are more binding than others. The difficulty in identifying the relative importance of each regulation stems from the lack of empirical studies, and from the fact that they have been in place simultaneously, and across very different regions. In addition, some regulations (particularly on sharecropping and renting out of ejido land) are often by-passed; this probably varies from region to region and on the 'political climate' that determines when and how carefully the law is enforced[50]. Thus it is probably the case that at times the regulations on credit to the ejido are the major deterrent to agricultural growth. But at other times restrictions on sharecropping and rental might play a key role limiting rural incomes, while yet in other cases it is the absence of investment which is the limiting factor (which in turn might be depressed due to uncertainty or to deteriorated terms of trade). I now turn to four particular issues that merit special attention.

One, restrictions on the use of (private and ejido) land imply the absence of a mechanism to equate the marginal productivity of land across various uses. In private agriculture, land (particularly in large farms) can at times not be switched across different crops. In ejido agriculture land cannot be rented or exploited through sharecropping and other tenancy

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[49]See Yates, op. cit., chps. 7 and 8 for a good description of the legal framework, of the incentive problems it creates, and of the amazing array of restrictions and regulations. Since then some modifications have been made to the agrarian laws, although it appears that the main impediments and contradictions remain (cf. Heath, 1990; Velez, 1990).

[50]"Although, in spite of the law, renting is currently widespread, it is reasonable to argue that, in the absence of any ban on leasing, the incidence of this practice would be even greater: there are pressumably a number of ejidatarios (particularly those on bad terms with the ejido leadership) who are deterred from renting by the prospect that their parcels may be confiscated" (Heath, 1990, p. 11).

arrangements. This need not imply that ejido agriculture is less efficient than private agriculture (in plots of similar size, with similar access to water, etc.). In fact, the empirical evidence on this score is ambiguous: "It is almost impossible to draw hard and fast conclusions about the relative productivity of private farms and ejidos in the recent period" (Heath, 1990, p. 3). Yet, when the restrictions are imposed they imply that the returns to land are below the maximum attainable. Moreover, the rural poor own land under both tenure systems, and poverty is associated with both[51]. In addition, they are also affected by regulations on large private farms through its effects on the demand for labor.

Two, regulations in agriculture have an effect on the market for credit, particularly in the ejidos. Since ejido land cannot be mortgaged, most credit for the ejidos comes from public sources[52]; in addition, individual ejidatarios are not allowed to contract credit on their own, but must do so as a joint operation of the community (although this changed very recently). Joint provision of credit creates three problems. First, there is no mechanism to insure that credit is allocated to efficient producers[53]. Second, the joint nature of credit creates a free rider problem resulting in large default rates. In effect, credit becomes a subsidy to production and consumption (Yates, op. cit., p. 209). The associated subsidies to public agricultural credit institutions are probably regressive, since there is no mechanism to insure that the subsidized credit goes to the poorest

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[51]As mentioned in section IV, the IES does not allow one to connect earnings with asset ownership. Nevertheless, household studies report low incomes for small scale private agricultural producers and ejidatarios, so it seems safe to assume that some of both are among the poor; see Finkler (1978) and Roberts (1982).

[52]Commercial banks can lend to ejidatarios, but do so accompanied by guarantee schemes provided by second tier institutions.

[53]A related problem is that credit is given in kind which appears to create problems with timely delivery, an issue of particular importance in agriculture. In addition, "..partly in order to achieve economies of scale in procurement, (Banrural) operates with a standarized input package that is insensitive to regional variations in input requirements and prices" (Heath, op. cit., p. 21).

ejidatarios[54]. And while agricultural credit is not the first best instrument to subsidize consumption, this subsidy, by construction, cannot reach landless rural inhabitants, who are probably among the poorest of the rural poor. Third, credit to the ejidos is made contingent on crop choice, with emphasis on corn, beans and basic cereals. There is almost no credit for livestock, nor for other crops that might be more labor intensive or have higher value per acre[55]. This limits the returns to both ejido land and labor.

Three, the rural labor market suffers from at least five distortions. First, regulations on private agriculture (particularly large farms) can at times depress the demand for labor, since land used for cattle-grazing may not be used for crops (which are probably more labor-intensive), even if this is feasible and profitable. Second, certain practices that ejido owners might engage to reduce risk and diversify their earnings sources are prohibited; in particular, sharecropping is not allowed, nor is the renting of land to

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[54]"Empirical data suggests that not even the institutional credit channeled through Banrural is reaching a significant portion of the poorest population." (World Bank, 1989a, Vol I, p. 56). Heath, op. cit., also notes a "..tendency to use credit for political rather than economic purposes" (p. 5). In addition, he notes that "State lending policy reflects a confusion between the objective of poverty alleviation and the objective of enhancing agricultural productivity" (p. 40).

[55]Crop diversification is one of the key mechanisms to increase the returns to land. Yet changes in cropping patterns have been very uneven. In the North and North-West there seems to be a "..remarkable degree of responsiveness to market incentives" (Yates, op. cit., p. 53), but in the Altiplano and Center the dependence on corn and beans has been increasing, although these are among the crops with the lowest value in terms of output per acre. Of course, crop choice depends not only on access to credit, but also on risk considerations, access to water, and timely access to fertilizers and transport; see below, section VI.5.

private producers[56]. Third, crop choice limitations in ejido land (derived from the crop-contingent nature of public credit) reduce the demand for labor if ejidatarios wanted to switch to higher value and more labor intensive crops. Fourth, labor mobility of ejidatarios is reduced given the risk of losing their right to exploit a given parcel of land[57]. Fifth, the law "..prohibits ejidatarios from using hired hands as a substitute for their own labor; however, they may employ hired workers as a supplement to their own labor input, providing they themselves are fully employed in working the parcel." (Heath, 1990, p. 10-11).

Finally, investment incentives are reduced, for four reasons. First, in private lands investment is constrained by limits to land holdings, potential

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[56]Sharecropping and other rent-out arrangements allow ejidatarios to diversify weather-related risks of agricultural production. With sharecropping part of the output risk is borne by the worker. Renting land allows the ejidatario to work elsewhere (probably through circular migration) and earn wage income whose variance is not correlated with agricultural output. In addition, renting out land might generate a better pairing of labor ability with land, as not all ejidatarios are equally skilled; differently put, renting out land is a partial solution to the ejido-induced problem where 'bad farmers cannot quit, while good farmers cannot expand'. Roberts (1982) discusses some evidence of this, and shows that even very poor producers in backward regions of Oaxaca (La Mixteca Baja) engage in a combination of on and off-farm labor. Finkler (1978, p. 105) investigates ejido arrangements in El Mezquital Valley in Hidalgo and argues that "...sharecropping provides an avenue for economic improvement." Similarly, Heath (1990, p. 5) notes that: "As well as placing ejido land in the hands of private farmers, these practices (i.e., sharecropping and renting out, S.L.) also create employment within the ejido; ..., in any event, they ensure efficient exploitation of ejido land by placing it in the hands of those with the means and the vocation to work it." It is now generally recognized that sharecropping arrangements of various sorts need not be inefficient but rather should be seen as a response to the absence of a market for risk and to costs of monitoring (cf. Stiglitz (1989)); there seem to be neither equity nor efficiency reasons to discourage them. On the other hand, many observers point out that in Mexico the laws against sharecropping and renting out of ejido land are increasingly violated (Heath, 1990, pp. 21-2, 34).

[57]"Thus, while ejido tenure guarantees the peasant a minimum level of subsistence, it also serves to tie the peasant to his plot and his village and usually precludes his search for alternative and supplementary forms of livelihood outside the confines of the community or its immediate environs" (Finkler, 1978, p. 104).

risks of land expropriation[58], and restrictions to the use of land. Second, given uncertainty about tenure and restrictions on sale (and rental), individual ejidatarios have lower incentives to improve their plot of land since if the sale is not allowed by the ejido authorities, or if the land is lost, such investments cannot be recouped[59]. Moreover, even if individual ejidatarios are certain about their property rights on their own parcel, restrictions on sale might still deter investments (particularly by the better-off ejidatarios), since the option value of liquid capital (or investments in areas other than agriculture) will exceed the value of investments in a non-marketable asset[60]. This implies that some investments must be carried out by the public sector (water pumps, irrigation channels, storage facilities, etc.). Third, investments by ejidatarios in communal lands may be depressed[61]. Four, joint operations between private and ejido agriculture are limited[62].

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[58]"Vagueness and contradictions in the law create a climate of uncertainty that may discourage on-farm investment by both ejidatarios and private farmers" (Heath, 1990, p. ii). Uncertainty also derives from the fact that different presidents and state governors have historically shown different preferences for enforcing this or that law. This also generates a bias against projects with a long gestation period (e.g. perenial crops): a new regime always opens possibilities for different interpretations of the law. In addition, note that the 'certificados de inalienabilidad' that are at times used to by-pass this problem may be time inconsistent given their fixed period nature.

[59]Ejidatarios might be evicted from the ejido if they fail to exploit the land, rent the land, or engage in sharecropping. In addition, since many ejidatarios have parcels that are smaller than the legally prescribed minimum of 20 (rain-fed) hectares, they face some uncertainty about their own tenure. (In 1981 the average size of ejido parcels was 7 hectares.)

[60]A rental market for ejido land could reduce the deterrent effects on investment, since improvements to land could be reflected in the rental rates. This would require that rentals of ejido land be legal, and that long term contracts be allowed.

[61]Heath (1990, p. 13) notes that only 27% of ejido lands are cultivated. And while the remaining lands are probably unsuited for agriculture (too steep, etc.), they could be exploited as forests or for other purposes. Communal property also appears to produce over-grazing of pasture lands.

[62]"Ejidos can form their own enterprises, but (the) legal framework prevents them from forming cooperative ventures with domestic and foreign companies who could provide technology and market access." (World Bank, 1989a, Vol. I, p. 55).

How can the incentive structure just described be reconciled with strong agricultural growth up to the mid 1960's? A potential hypothesis is that in a context where the land/labor ratio was high, land-redistribution and the co-habitation of different tenure systems was compatible with sustained growth. But population growth implied that the extensive margin would eventually be exhausted, a point that seems to have been reached in the mid-1960's. Yet, precisely at this time the process of land redistribution was accelerated[63]. An important effect of this was an increase in uncertainty regarding land tenure, both for ejidatarios and for private owners. For ejidatarios uncertainty regarding tenure increased since while the law prescribed a minimum size of 20 hectares for each individual parcel, actual size was significantly below this level. For private agricultural owners uncertainty increased since expropriation risks were higher[64]. This reduced the private incentives for investment in agriculture precisely at the time when growth along the intensive margin became more important. The slowdown in private investment, together with the end of easy irrigation projects and deteriorated terms of trade[65] is responsible for the stagnation in agricultural growth observed since then.

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[63]Heath (1990, table 1) shows that of the 105 million hectares distributed by the government between 1900 and 1988, 24.7 (or 23.5%) million were distributed in the period 1965-70, exceeding the 18.7 million hectares distributed during the Cardenas period (1934-1940).

[64]Yates summarizes the matter aptly: "Without any doubt, the agrarian reform in its early years provided a strong stimulus to agricultural expansion, in particular by putting large areas of mostly good quality but previously uncultivated land into the hands of a new class of operators who were eager to make it productive. Yet a program which was highly beneficial under a certain set of circumstances may....cease to have beneficial effects and may even begin to cause harm. For instance, a large portion of the ejidos created during the past fifteen years (1965-80, S.L.) have been given land which was well farmed by its existing operators, but whose productivity declined because of lack of know-how among the new settlers. On the other hand, many of the owner-operated farmers have been desisting from making investments in improvements because to do so would bring them in conflict with the agrarian laws or because they stood in continual fear of possible expropriation" (p. 66; emphasis added, S.L.).

[65]With respect to the terms of trade, Heath (1990, p. 5) notes that: "Two important studies have independently reached a significant conclusion about the 1970-82 trends: although total intersectoral resource flows showed a net gain for the countryside, relative price movements continued to favor the urban rather than the rural sector."

The policy response to the problem of diminished agricultural growth came in the early 1970's. Given the measures taken, ex-post it can be seen that from the government's perspective, the problem of agriculture was a problem of food supply, particularly of basic grains. Policies were implemented to increase food supply and incomes in the rural areas while at the same time maintaining the same institutional and land tenure structure. The policy response had many elements, chief among them: (i) an attempt to increase prices for basic crops, (ii) massive infusion of public credit, (iii) a special campaign to increase production of beans and corn, (iv) the formation of collectivized ejidos, (v) strong emphasis on specializing production patterns along food self-sufficiency lines regardless of international prices, and (vi) provision of additional subsidies to inputs like fertilizers and electricity (cf. World Bank (1989a), (1990b)). These policies have been costly in terms of subsidies to fertilizers, agricultural credit, electricity, crop insurance and price supports[66], and have probably provided large rents to higher income producers[67]. Unfortunately, they have been unable to produce

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[66] The World Bank (1989a, Vol. I, p. vii) estimates that untargeted subsidies to agricultural financial institutions and agricultural inputs totalled US 2.4 billion in 1988. The report also notes that these subsidies "..total about 10 times the public investment in the sector. Simply reducing the losses of the financial institutions could double the total public investment in the agricultural sector" (p. 8).

67 The evidence on rents is patchy, but plausible. With respect to fertilizers Yates (op. cit., p. 212) claims that "..the fertilizer subsidy chiefly assists those who ordinarily use large quantities of fertilizer, which in practice particularly means farmers in the irrigation districts, but it does nothing for the subsistence cultivator in the mountains of Oaxaca." With respect to credit see footnote 54. With respect to water Yates notes that "It seems puzzling that successive governments pursued this policy of subsidizing irrigation water, to the benefit of what is after all the richest section of the farming community." (p. 81). With respect to marketing Heath notes that "..the marketing subsidy manifests the same contradictions as subsidized credit programmes: it was initially designed to benefit the poorest producers but has ended up providing an unnecessary cushion to commercial-scale producers and wholesalers.." (1990, p. 44). With respect to price supports, an argument that they are also regressive can be made along Ricardian-rents lines, since the price support affects a crop grown on lands of very different productivity and a larger share of marginal lands is owned by the poorer rural producers: "Moreover, the use of price supports for maintenance of income may work fairly well in a country where the gap is not too great between the higher and the lower income farmers, but in a developing country where half the farm population operates on a subsistence basis, redistributive objectives cannot be obtained in this way. A corn price which is barely adequate for a poor peasant in Oaxaca spells riches to an irrigation farmer in Guanajuato" Yates, op. cit., p. 233.

significant increases in agricultural output or generalized rural development with higher returns to land and higher wages for unskilled rural labor.

V.2 Urban Bias.

Persistent imbalances in inter-sectoral resource allocation between rural and urban areas also play a fundamental role in the generation of poverty. A proper study of urban bias in social and infrastructure spending requires systematic data-gathering to quantify the associated flows. Here I restrict myself to a listing of five areas where this bias is most directly observed: health, education, housing, public infrastructure, and subsidies for goods and services.

Aspe and Beristain (1984) studied the regional distribution of government resources for health and education. With regards to education they find that while the share of public sector expenditure in education in GDP rose steadily from 1960 to 1978, resources allocated to elementary education in the rural areas have fallen, despite the growth of the younger-aged population during that period (pp. 291-300); a privileged share of expenditures was devoted to higher education, located mostly in urban areas. Thus, independently of the rural poor's ability to demand education (see section VI.1 below), the supply of educational facilities has been insufficient[68]. A related phenomenon is observed in the provision of health services. On the whole, they note that: "The greatest significance of this study is a negative one: the (government's, S.L.) educational and health policies have not been corrective and have not diminished the disparity in income, but have, on the contrary, confirmed and reaffirmed these conditions" (p. 323). Similar results are obtained by Moore (1984) with regards to the provision of public housing who notes that: "In spatial terms it is evident that housing policy has been concentrated in the capital city, to a lesser extent in other metropolitan areas, and is almost absent in the rural context" (p. 352). And still the same type of biases are found against the poorest states with the higher share of rural population in the allocation of public infrastructure investment (cf. World Bank, 1989a, pp. 13-31).

Urban bias also appears in the pattern of subsidies. This hurts the rural poor in three ways. One, urban inhabitants appropriate the bulk of food

[68]Of course, issues as to the quality of education are equally relevant.

subsidies (see section VII.2 below). In addition, urban inhabitants, particularly in Mexico City, also profit from large subsidies to water, transportation and other services provided at the expense of the whole country[69]. Two, subsidies to Mexico City and other urban areas reduce private costs of production below social costs[70]. This lowers the demand for rural labor in those activities that could be decentralized. Three, huge expenditures in the development of the urban infrastructure reduce available resources for rural infrastructure[71].

To sum up: the combined effects of intra and inter-sectoral government policies doubly discriminate against the rural poor. First, to the extent that agriculture and the rural areas as a whole receive an inequitable share of the total resources devoted to social and infrastructure investment. Second, to the extent that those resources that are channeled to the rural areas are mostly untargeted and benefit better-off producers in those areas. Some of these policies hurt the rural poor directly, limiting the demand for their labor or the returns to their land by increasing transport costs, reducing crop choice, mobility; others do so indirectly, limiting their access to education, information, health services and general possibilities to improve their human capital. This combination of institutional arrangements and government policies taxes agriculture, particularly the rural poor, and generates inefficiencies. Taxing agriculture might have been the unavoidable cost of urbanization and industrialization. But if poverty is to diminish this taxation and these efficiency losses must end.

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[69]The pattern of transfers between the federal budget and Mexico City is complex, but favors the latter; see World Bank, 1989c, Vol. I, pp. 85-100.

[70]Gil Diaz (1985) presents an illuminating case study of the distortions introduced by the fact that the private marginal cost of water in Mexico City is zero; other services like transportation are subsidized, while user charges are below marginal costs.

[71]The relationship between urbanization and poverty in Mexico deserves a study of its own. Polak and Williamson (1989) make the interesting observation that in England and other countries industrializing in the XIXth century poverty was mostly an urban phenomenon. They attribute this partly to the fact that modern urbanization is immensely capital intensive, requiring a large share of the country's resources. A. Lewis (1978, p. 29) notes that: "Urbanization is decisive because it is so expensive. The difference between the cost of urban and rural development does not turn on comparing the capital required for factories and that required for farms. Each of these is a small part of the total investment, and the difference per head is not always in favor of industry. The difference turns on infrastructure."

V.3 Macroeconomic Policy.

Lagging rural development and urban bias have characterized Mexico since at least the 1960's. In addition, since the early 1970's the macroeconomic environment has been less stable. I briefly mention here two channels by which this affects poverty. First, as elaborated on in the next section, the poor, and particularly the extremely-poor, have lower ability to bear risk. Uncertainty is a fundamental determinant of their decisions with regards to migration, on and off-farm labor, crop choice, etc.. And while some sources of uncertainty are truly exogenous (e.g. the weather), others derive from cycles induced by macroeconomic policy. A general environment of certainty is, from the point of view of poverty, a public good. Increases in the demand for unskilled labor that result from unsustainable macroeconomic expansions probably fail to help the poor. If the poor perceive such increases to be transitory it may not induce them to abandon self employment in their marginal lands. On the other hand, if they do change their behavior they will then suffer income losses when the unsustainable output expansion terminates. Macroeconomic uncertainty, moreover, depresses the medium term aggregate demand for labor[72]. In addition, given the extremely-poor's need for security, stop-go social spending programs are not as effective as those that deliver steady benefits, even if they cost the same (see below)[73].

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[72]The effect of uncertainty on the demand for labor is ambiguous (negative) for a risk-neutral (averse) profit maximizing firm. Aspe and Blanco (1984), however, find that for Mexico higher macroeconomic uncertainty has lead to lower employment; they measure uncertainty by the one-step ahead variance of the forecasting errors for two macro time series (the price level and the money supply), and cannot reject the hypothesis that for the period 1973-80 uncertainty increased depressing output and employment.

[73]An analysis of the impact on the poor of the 1983-88 macroeconomic crisis is beyond the scope of this paper. Lustig (1990) argues that most of the income contraction occurred within the middle and lower-middle income strata of the population. The World Bank (1989b, p. ii), however, argues that: "The poor bore the brunt of the economic crisis." A fuller analysis of this issue will be feasible once the 1989 IES is available. Nevertheless, note that to the extent that untargeted subsidies to food and agriculture were relatively ineffective in reaching the poor, the direct effects of the fiscal cuts might not have been severe. The poor, particularly the rural extremely-poor, were not receiving significant benefits before the crisis anyway. On the other hand, the indirect impact could be more significant, as the cuts in infrastructure investments for irrigation, rural roads, etc. have negative medium term effects on the poor's earnings opportunities.

Second, asymmetries in the availability of information and access to hedging possibilities imply that the inflation tax cannot be evaded equally by all. The poor may at times have financial assets that from their perspective are significant (e.g. cash balances held in the interlude between the sale of a crop and the purchase of goods or inputs). Eroding the value of these assets through inflation limits the poor's possibilities for medium term accumulation.

VI. Policies for Poverty Alleviation.

This section is concerned with the design of government programs to alleviate poverty. The objective is to construct a poverty program whose various components deal most effectively with the different dimensions of poverty. Since policy must be based on the behavioral characteristics of the target population, I begin in sub-section VI.1 with a discussion of the needs and behavior of the extremely-poor and the moderately-poor. I next turn in sub-section VI.2 to discuss four considerations that affect the nature of government intervention in poverty alleviation. In sub-section VI.3 I pull together these two strands to identify the objectives of government intervention in poverty alleviation, and the various components of a poverty program. Sub-sections VI.4 and VI.5 discuss the specific components of the poverty program.

VI.1 Needs, Behavior, and Policy.

Policies to help the extremely-poor and the moderately-poor must take as departure point their characteristics; this allows to identify each group's needs and directs policies to the relevant margin. Seven characteristics of the extremely-poor merit attention.

One, the extremely-poor have higher fertility ratios and more children per household (Lipton (1983b), Birdsall and Griffin (1988); table 3 above)[74]. In these households children play the role of insurance policies for the future and, after age 5 or 6, additional labor force[75]. There is growing evidence that high fertility is a result of the characteristics associated

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[74] I was unable to find any studies linking fertility to income levels in Mexico. The tabulations that I obtained from the 'Encuesta Nacional de Fecundidad y Salud' carried out by the Ministry of Health in 1987 only classify women into urban and rural groups. Global fertility ratios for urban (rural) women for the period 1981-86 were 3.6 (5.6), respectively.

[75] What is not clear is how out-migration changes this situation. If migrants send remittances, the initial investment by parents is recuperated while household size falls; else migration can reduce average incomes for extremely-poor households.

with poverty, particularly high infant mortality rates[76]. Having extra children "..can be interpreted as the insurance response parents make in the face of high infant mortality. As the risk of infant mortality declines, these excess births should become unnecessary" (Birdsall and Griffin, 1988, p. 36). Thus, it appears that fertility declines follow reductions in infant mortality[77]. Higher infant mortality, in addition, increases the number of pregnancies for extremely-poor females since: (a) more children are wanted and, (b) more replacement births are required to attain the desired family size. This increases the dependency ratio, as female members retire from active participation in work during childbirth and lactating periods. Higher fertility, however, may also be due to lack of education and access to birth control methods. Hence, unwanted pregnancies are higher. Unwanted pregnancies that lead to abortions are an additional burden on the health and nutritional status of females[78]; those that lead to children, on the other hand, further increase the dependency ratio.

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[76]See Mina Valdez (1988) for a study of infant mortality in Mexico. In particular, see his table 5, p. 280, where average infant mortality rates for the period 1965-79 for eight 'social classes' are computed as follows: bourgeoisie, 36.5; new petty bourgeoisie, 30.2; traditional petty bourgeoisie, 54.1; non-wage free laborers, 57.3; typical proletariat, 59.2; un-typical proletariat, 53.5; peasants, 81.2; agricultural proletariat, 96.7. While it is difficult to interpret some of these social classes, these numbers do roughly indicate a strong association between lower income and high infant mortality. Also, the World Bank (1989b, p. 42) estimates infant mortality rates in Mexico per live births of 20/1000 in the metropolitan areas vs. 80/1000 in backward rural areas. Finally, a 1982 nutrition survey in rural areas of Oaxaca found that women average nine deliveries during their childbearing years, with only five children surviving to adulthood (Torche, 1990, p. 13).

[77]There is, of course, a lag between the drop in infant mortality and the behavioral response of parents to limit family size and increase investments per child; this lag is sometimes referred to as the 'demographic transition', and explains why in most LDC's death rates fell long before birth rates. Policy can influence this lag be reducing child mortality and increasing income security (cf. Birdsall and Griffin, 1988, p. 37).

[78]Preliminary results from the 1988 National Nutrition Survey show that one-third of all pregnant women have an inter-birth interval of less than 24 months, and that women with short birth intervals have significantly worse hemoglobin levels (World Bank, 1990a, p. 3).

Two, the extremely-poor may not be able to respond to transitory real wage declines by working more hours[79]. Downturns cannot be offset by working more if households are already working all they can[80]. This might be particularly relevant for rural households which may also have lower mobility (because walking to distant work consumes too many scarce calories, because they live in remote regions with little transportation, or because they cannot afford the transportation) and fewer alternative opportunities in any given location. Thus, temporary downturns in the labor market may have direct nutritional repercussions[81].

Three, the extremely-poor appear to have higher age-specific participation rates, which affects their demand for education. The children of the extremely-poor may participate early in economic activities in both urban (begging, shoe shining) and rural (working on the family farm, household activities) settings. Independently of the supply of educational facilities, the opportunity cost to the household of having children in school is too high, so that the extremely-poor, as opposed to the moderately-poor, may not be in a position to benefit from educational programs. "In low income households, investments in the human capital of children, which provide lifetime returns to the child but possibly not to the parents making the investments, may be sacrificed to more immediate household needs" (Birdsall and Griffin, 1988, p. 34). Conversely, households with higher incomes can increase investments per child, in a sense engaging in a trade-off of quantity for quality. With larger number of children such investments may be deterred if parents face the risk of losing their investment through child death.

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[79]The 'unemployment rates' registered in table 6 for the lowest income groups would seem to contradict this statement. But recall that the IES only inquired about employment status on the previous month, so that there is a large element of seasonality. A more detailed study of labor participation rates by income groups is required.

[80]Contrast this with the usual response for higher income groups, where as income falls the cost of leisure is higher; an increase in hours worked can then partly offset the income fall. At the level of the household this can imply that members that were previously not working can temporarily join the labor force (as probably happened during the 83-88 crisis).

[81]"A survey carried out in 1982 in Oaxaca by the National Institute of Nutrition indicates that seasonal variation in food intake is widespread, with a pattern that falls between 1,900 calories per capita per day during harvest time, to close to about 1,400 in the period immediately before harvest. Many infants between 8 and 18 months are not able to survive the drastic decline in food availability" (Torche, 1990, p. 13; emphasis in the original).

Higher age-specific participation rates also imply that targeting food to children through school lunches or similar mechanisms may miss the extremely-poor; their likelihood of being in school is lower[82].

Four, because they live so close to income-induced nutritional risks, the extremely-poor have lower ability to bear risk. If they have little access to credit[83], and few physical assets, downturns in earnings are immediately translated into lower consumption. This may affect their ability to participate fully in the labor market (or to innovate in the farm with new technologies). In particular, for extremely-poor rural households holding on to small pieces of (probably marginal) land that, on average, generate less income than participating in the labor market may be an optimal strategy for three reasons. First, participation in the labor market may be risky, particularly in rain-fed rural areas with high weather variability[84]. Second, if they live in remote areas with little transportation the supply of food may be uncertain; erratic or high cost transportation may make autarky, particularly with regards to food, a sensible strategy. Third, for ejidatarios full participation in the labor market may entail the risk of losing their land. While I have no direct evidence for Mexico, it is plausible to posit above-average risk aversion for the extremely-poor.

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[82]Which is not to deny that, at the margin, school lunches may serve as an incentive for extremely-poor children to attend school (or provide incentives to their parents to send them to school by increasing the opportunity cost of child labor).

[83]Unfortunately, little is known about informal credit arrangements in Mexico. If risks are household specific (as is more likely in urban areas) there might be possibilities to borrow from households in the same area. If risks are region specific (as may be more likely in a given rural region dependent on rain-fed agriculture), such borrowing possibilities may be less likely, as all households will be similarly constrained.

[84]Risk considerations probably affect too their migratory behavior Roberts (1982, p. 319) notes that poor households in Mexico "...cannot afford to undertake the substantial investment needed to support a circular migrant and the risk that he will not quickly obtain a job and send remittances." Recall from table 5 that migrant remittances account for a very small share of the extremely-poor's earnings. On the other hand, most studies of labor market behavior in rural areas concentrate on households who own land (either private or ejido). Much less is known about landless households (cf. Gregory, 1986, pp. 110-13). This is a significant omission, since not only are landless rural households among the very poor, but also due to the semi-frozen nature of the land ownership pattern there is a strong likelihood that the marginal rural poor is landless; see below, section VI.

Five, the composition of the diet for the extremely-poor is different, as well as the price and income elasticities of demand for food. At very low income levels, households consume a diet composed of cheap calories. Some evidence also shows that in the range of extreme-poverty Engel's Law (as income increases the proportion spent on food falls) is violated[85]. There is, in addition, "... compelling evidence that the poor are more responsive - to income, own-prices, and cross-prices - than the rich" (Behrman and Deolalikar, 1988, p. 677). Studies also show that a distinction is required between the income (or expenditure) elasticity of demand for food and the income (or expenditure) elasticity of demand for nutrients (of which more below).

Six, for extremely-poor households nutritional status appears to have a direct impact on productivity, both for adults and for children. For adults studies by Strauss (1986) for Sierra Leone and Deolalikar (1988) for India find that agricultural labor productivity increases with calorie availability[86]. For children it appears that school performance also improves with nutrition: anthropometric indicators like height for age (which reflects the cumulative outcome of nutrition) appear to positively influence both the probability of being in school as well as relative performance[87].

Finally, the importance of intrahousehold inequality is higher. While this inequality is probably not unique to the extremely-poor, it is

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[85]Lustig (1984, pp. 443-4 and table 14.4) presents evidence based on the 1977 Income-Expenditure Survey that shows significant differences in the diet composition of Mexicans when classified by income groups; she also runs log-linear regressions of food expenditures on total expenditures for poor households in 18 regions and finds that the associated elasticity exceeds unity in 13 out of the 18 regions (op. cit., table 14.8). Lipton (1988a) quotes evidence of the failure of Engel's law for Northeast Brazil; see also Streeten (1989b).

[86]Note that the causality between nutrition and productivity is not obvious: if higher labor productivity increases income then nutrition may also increase (given greater food consumption); conversely, more nutrition may increase labor productivity which then increases income. The Strauss and Deolalikar studies correct for this endogeneity (see Behrman and Deolalikar, 1988, pp. 683-86).

[87]These results are found in studies of children in China and Nepal; Behrman and Deolalikar (1988, pp. 688-89) point out, however, the possibility of self-selection bias: school performance is observed only for those who did go to school (and did not drop out).

operationally more important, as it determines how additional resources for the household as a whole translate into resources for each member of the household[88]. If such inequality is significant, it may imply that additional resources for the household as a whole may fail to reach some individual members (e.g. children)[89]. Under these circumstances more detailed targeting may be required[90].

VI.2 Determinants of Intervention in Poverty Alleviation.

The central aim of government poverty programs should be to create conditions where the poor can increase their income and improve their living standards. To translate this aim into operationally useful objectives, it is necessary to consider not only how the poor behave, but also other factors that condition the form of government intervention. There are four dimensions of this problem that I want to emphasize.

First, an **inter-temporal dimension**: the extent of poverty in Mexico implies that it cannot be eliminated in a short period of time (say, two to three years). This creates a need for balanced interventions that help the poor immediately, but also create conditions for them to grow out of poverty. A poverty program that contemplates a permanent need for generalized income or

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[88]Unfortunately, little is known about this problem in Mexico. Sen (1988) and Bardhan (1988) discuss its importance for India (with emphasis in sex bias); Behrman (1988) presents evidence of age-bias in poor rural Indian households, with parents discriminating in favor of earlier born children in the allocation of nutrients (with the effect having a seasonal component). Haddad and Kanbur (1989), on the other hand, find that intra-household inequality may lead to underestimates of the true levels of poverty and inequality, but that the estimated patterns of poverty across groups are relatively invariant.

[89]This may or may not be a manifestation of sex or age discrimination. It may pay for the household as a whole to concentrate resources on the more able members who are the principal 'bread winners'.

[90]This provides the rationale for targeting individual members within the household, like milk to children under five years of age, or additional food for pregnant and lactating mothers. In the absence of household inequality such degree of targeting would be unnecessary. On the other hand, note that if such inequality is significant, the effects of this targeting may be partly offset if the amount of own household resources allocated to the targeted members is reduced when the targeted program is implemented so that, for example, after a shool lunch program parents no longer give milk to their children since they expect them to get it at school; see below, section VI.4.

consumption subsidies is, even if budgetarily feasible, not focusing on the right objectives. The appropriate mix between policies that increase current consumption of the poor and investment policies that generate future growth in their income is a key issue. Now, if the government has one peso to spend on poverty programs, should this be spent to increase current income[91], or should it be allocated to investment? In a world of full information and no externalities the answer is that if the objective is to maximize the poor's welfare, the government should increase their current income; then, depending on the poor's discount rate, they can chose the optimal mix between consumption and investment, i.e., the optimal mix is determined by the direct beneficiaries of the program. For three reasons this solution is inadequate for Mexico (and, presumably, for other developing countries). One, the presence of externalities associated with infrastructure and other investments generates a difference between the private and the social rate of return to investment: if the government does not carry out the investments in, for example, roads in poor rural regions, it is unlikely that poor people will do so. The unfeasibility of full private appropriation of the benefits from roads reduces the private incentive for this type of expenditure. Two, some investments are lumpy and indivisible, so single individuals on their own at low levels of income might not be able to purchase the required amounts. Three, the existence of intra-family inequality implies that current income transfer may fail to increase investment by the family in the welfare of some of its members (e.g. schooling for children).

Second, there is an informational dimension: identifying the poor is difficult and costly. In addition, some might live in remote areas. Targeting and delivering income or consumption subsidies to the poor is therefore administratively difficult, and raises the cost of subsidy programs. Moreover, if direct subsidy programs are permanent frequent testing to determine eligibility will be needed. Of course, as I discuss below, targeting can be refined by methods that induce self selection of the beneficiaries, through either the location of where benefits are given, the quality of the goods delivered, or the type of goods subsidized. But any realistic program of direct subsidies to the poor will leak to the non-poor. From the viewpoint of poverty alleviation this is a net loss.

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[91]Current income can be increased either by direct income transfers or indirectly via subsidies to consumption; from our perspective here consumption subsidies (say for food) should be thought of as additional purchasing power; see section VI.4 below.

Third, there is an incentive dimension: policies that help the poor need to avoid the creation of a class of 'welfare dependents'; the incentive structure must be such that, at the margin, it always benefits the poor to work and earn additional income. This point is illustrated in figure 4[92], where the horizontal axis plots the income of individuals before any government program (or 'original income'), while the vertical axes measures income levels after the government program (or 'final income'); as before, z denotes the poverty line. Assuming the government can measure everybody's income, it can potentially increase each individual's income by the difference between z and the 45° line. This eliminates poverty (with the total cost of the program given by the triangle OAz). The program is financed by taxes on individuals with incomes above z, so that their final income lies below the 45° line. Note now that when original income increases along the range Oz, individual's final income stays constant. Differently put, along the range Oz poor individuals face a marginal tax rate of 100%. In this type of transfer scheme every additional peso earned by the poor is matched by one peso of transfers taken away. The problem with this scheme is that the transfer depends on individuals' income. Under these circumstances it is natural to expect that individuals will modify their behavior to take advantage of this scheme (or any other so-called 'means-tested' scheme where benefits depend on characteristics that are under the beneficiaries's control). Clearly, schemes that simply transfer income to the poor give no incentive for them to work[93]. Thus, incentive considerations argue strongly against direct income transfers.

Finally, there is a dimension of bounded rationality and administrative capability: there is a limit to the number of policies and programs that the government can run in a cost-effective and efficient way. A large number of programs opens more possibilities for waste and duplication (cf. section VII.1, below). In addition, programs that create multiple prices for the same commodity open possibilities for graft. A desideratum is for the government to concentrate on a few programs, but to implement them well. As in any other area of intervention, minimizing the possibilities for government failure is also important.

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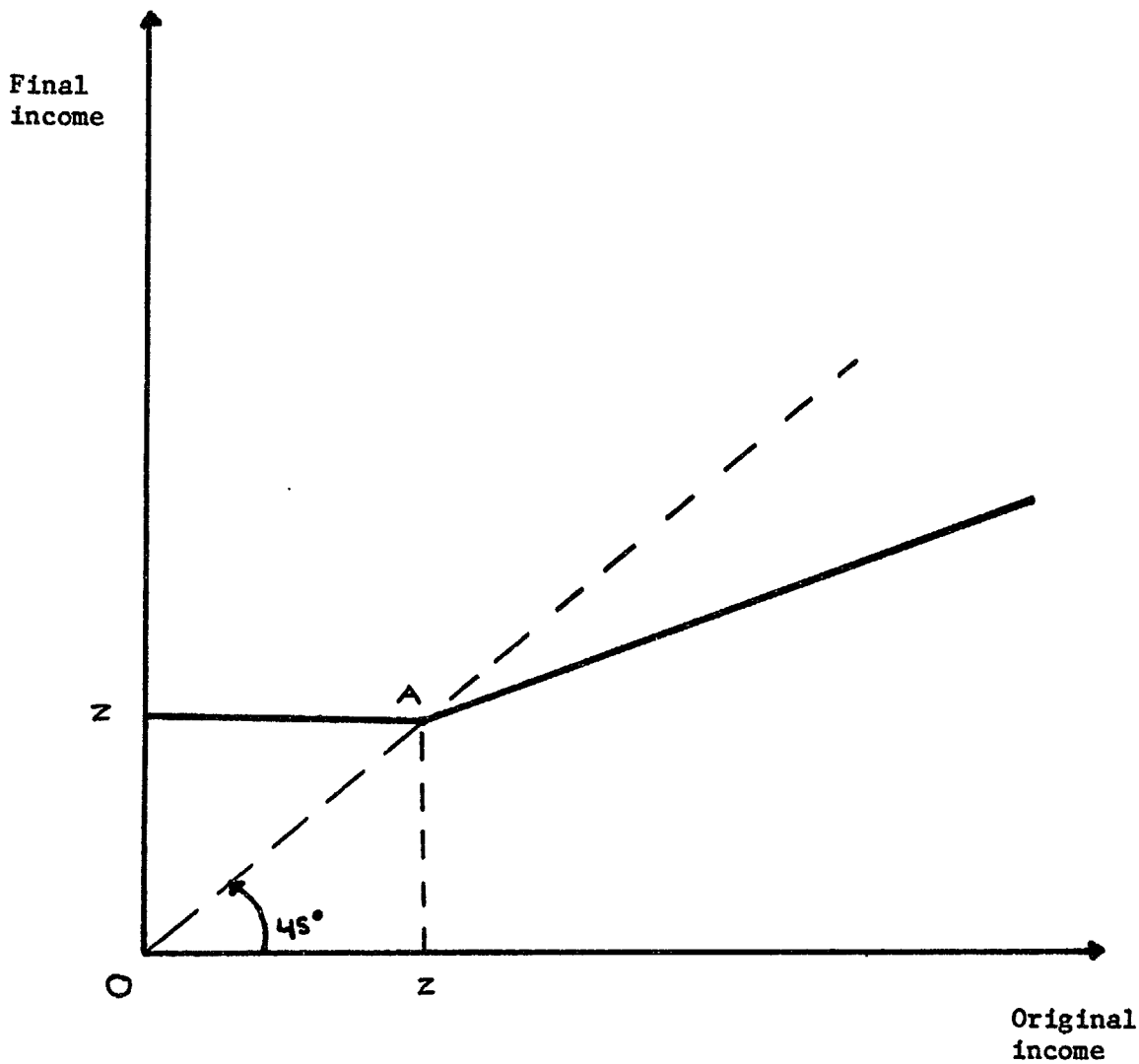
[92]This discussion is based on Besley and Kanbur (1990).

[93]Note also that if as a result of this transfer scheme the poor fail to work, the cost of the program doubles to the square OzAz, requiring higher marginal tax rates on the non-poor population to finance it, i.e., the solid line beyond z is flattened, generating work dis-incentives for the non-poor.

Figure 4



VI.3 Objectives in Poverty Alleviation.

Given the needs and behavior of the poor, and the intertemporal, incentive and other considerations just made, what should the objectives of the government in poverty alleviation be? There should be a fundamental difference in objectives for the moderately-poor and the extremely-poor. The four considerations discussed in section VI.2 point in the same direction: the orientation of government programs for the moderately-poor should be tilted in favor of investment and the creation of opportunities to enhance their earnings potential. Informational, incentive, externality and administrative reasons all imply that the comparative advantage of government intervention in the alleviation of moderate poverty is to help people indirectly, rather than through direct income or consumption subsidies. Resources can be most effectively used to create institutional environments where the earnings potential of the assets owned by the poor (in particular, their land and labor) is enhanced, at the same time that the possibilities for them to acquire human and financial capital are improved. Over the medium term, what matters most for the moderately-poor are the design of institutional frameworks and policies that do not discriminate against them, as has occurred in the past. There is no case for direct income transfers or subsidies to consumption of any kind, including food subsidies. This is not to argue that no resources should be channeled to the moderately-poor; it is to argue that those resources should be used for investment: primary and technical education; irrigation to increase the productivity of the land they own; timely access to fertilizers and credit to increase yields, widen crop choice; better roads and transportation to reduce (time and monetary) costs of mobility and amplify employment opportunities; infrastructure that promotes regional growth and permanent outward shifts of the demand for unskilled labor. These policies work directly at the relevant margin: increasing earnings opportunities.

The same is not true of the extremely-poor. As section VI.1 argued, they have a prior need to improve their health and nutritional status and break the 'vicious circle' in which they find themselves: unhealthy physical environments, morbidity, lethargy, high infant mortality and high fertility, inability to take risks, inability to demand education, thinly spread resources across large families, and transmission of this state of affairs from one generation to the next. Only when this vicious circle is broken can they 'get on their feet' and work their way out of poverty. Some minimum

level of health and nutrition must be met so people can invest in numan capital; or migrate across regions; or participate more actively even though risky) in the labor market; or engage in more (risky) innovations (new crops, techniques); or have less children and increase their investment per child. There is a case for directly targeted programs of income transfers or consumption subsidies for the extremely-poor.

I argue that the attack on poverty should be separated into two tasks. One, the provision of a basic package of directly targeted benefits for the extremely-poor. Two, the design of effective development strategies, where effectiveness is measured by the potential for increasing earnings of the poor. Separating these two tasks is essential: the policies and institutions required for each are different. Questions like how can targeted programs be organized in a cost-effective way, where should they be located, and how can incentive problems be minimized, pertain to the first task. Questions like where and what type of infrastructure should be provided, what should pricing policies for agriculture be, what reforms are needed for the ejido, and how can the demand for unskilled labor be increased relate to the second task.

But to argue the need for directly targeted benefits only for the extremely-poor is not to argue that they should receive no other benefits. Precisely the opposite is true. The extremely-poor also need policies that increase the value of their land and labor; they also need greater access to education and other opportunities for improvement. But they require, as opposed to all other groups, special attention to be able to fully profit from those policies.

This approach has two important implications. First, the case for some form of provision of direct benefits for the extremely-poor is not a case for distorting food prices for consumers or producers. Based on the considerations discussed above it is clear that with the potential exception of the extremely-poor (see below), all consumers should face prices for all food items that reflect their opportunity costs. Differently put, food pricing policies should be divorced from poverty considerations. Second, the needs of the extremely-poor provide a ranking of which services are essential and must be delivered to get any results, and which services are secondary (e.g. provision of housing). Thus, the approach directs government intervention in poverty matters to a well defined set of actions. This is important given constraints on resources and administrative capabilities. The

following sub-sections discuss the specific components of this general approach to poverty in more detail.

VI.4 Policies for the Extremely-Poor.

Policies for the extremely-poor should be based on their special needs and behavior (cf. section VI.2). These policies must act as close as possible to the relevant margin: improving health and nutrition. To achieve this, the links among income, nutrition, health, female education and fertility must be considered. I deal with each in turn.

First, the econometric evidence on the link between income and nutrition is ambiguous[94]. It appears that when income increases the demand for food increases (i.e., a positive and high income elasticity of demand for food), but that the additional food may not enhance nutritional status: consumers prefer to diversify the types of food consumed, and improve along the lines of presentation and palatability. But while the income elasticity of demand for nutrients appears low, the same is not true of the price elasticities. These findings "..suggest that certain food subsidies may not only fail in improving the nutritional status of the poor, but that they may actually worsen it" (Behrman and Deolalikar, 1988, p. 677)[95]. These results, together with the possibly low expenditure elasticity for calories weaken the case for generalized food subsidies, even for the extremely-poor. Until more evidence is available for Mexico, one can sensibly make a case, on nutritional grounds, only for some form of provision of nutritionally adequate foods.

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[94]For rural South India Behrman and Deolalikar (1987) find the income elasticity of demand for calories for low income groups to be very low; similar results for Nicaragua are found by Wolfe and Behrman (1982). On the other hand, some studies reviewed in Behrman and Wolfe (1984) find elasticities closer to unity. See Alderman (1989) for a recent review of the evidence; apparently the econometric estimates are sensitive to issues like aggregation and the specification of the food/nutrient conversion ratios. The nutritional content of even as finely a disaggregated commodity as 'rice' depends on its specific variety, as well as on the way it is cooked.

[95]The econometric studies of households' consumption demands for Mexico that I am aware of are too aggregated to pick up these effects; both Garcia Alba (1986) and Jarque (1987) estimate complete household demand systems, but only one category of food is included. Lustig (1984) derives price elasticities for some food categories from a Linear Expenditure System, but does not compute the elasticities for calories. This is an area where using results from other countries may be misleading, given differences in the nutritional content of diets across countries.

Second, the link between food and nutrition is strongly mediated by health status. Given the unsanitary conditions in which the extremely-poor live, and the prevalence of diarrhea and other intestinal diseases, making more food available to them may "...simply meet the needs of the worms in their stomachs" (Streeten, 1989b, p. 6)[96]. Improving health conditions is also essential to reduce infant mortality and, with a lag, fertility. The type of health services delivered is of central importance. Emphasis must be given to preventive medicine and the elimination of parasitic and infectious diseases. Aspe and Beristain (1984, pp. 301-09) show that Mexico has one of the highest age adjusted rates of mortality from enteritis and diarrheic diseases in the world; they also show that in 1975 parasitic and infectious diseases accounted for the largest share of death rates by age group[97].

Third, there is substantial evidence that education for the female head of household has a strong positive effect. Rosensweig and Schultz (1982) find in a study of Colombia that women's education reduces child mortality. Wolfe and Behrman (1987) find that in Nicaragua a mother's schooling has a positive effect on a child's nutrition and health. It also appears that more female education reduces fertility[98]. As with health, the type of education is very important. Since, as just seen, the extremely-poor may not be in a position to demand formal education, emphasis must be centered on issues like food

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[96]Preliminary results from the 1988 National Survey of Nutrition show that about 20% of pre-school children had diarrhea in the two weeks prior to the nutrition survey, with about one fourth of those cases being chronic diarrhea (World Bank, 1990a, p. 3).

[97]They also analyze government's allocation of expenditures in health services and note that "..the main share of the sector's investment is devoted to building enormous hospitals with sophisticated equipment, which do not take care of the problems of the underprivileged," and "..excessive importance and resources have been awarded to curative in relation to preventive medicine, which perpetuates the high infant mortality rate" (op. cit., p. 323-4).

[98]"Female education above four years, however, bears one of the strongest and most consistent negative relationships to fertility.... (and) is also associated with higher age at marriage, and may well have some intangible effects on a woman's ability to plan and on her taste for non-familial activities" (Birdsall, 1988, p. 514). There is also an effect that works through the opportunity cost of time: "As female education and female wages rise, the differential between female and child wages widens. This in itself tends to reduce fertility, since it means that the family's loss of the mother's income when children are young is not easily and quickly made up by children's work" (Birdsall, op. cit., p. 515).

preparation and conservation, disposal of wastes and hygiene, information on inoculations for children, usage of safe water, birth control methods to reduce unwanted pregnancies, and the like.

Differently put, the presence of strong complementarities in the needs of the extremely-poor has important implications for policy design. Programs for the extremely-poor that only provide one of these components may fail to achieve the goals of improving nutritional and health status and changing fertility behavior, even if they adequately reach the target population. Therefore, there is a strong case to aim for simultaneous provision of a basic package of food-health-education that exploits the complementarities between these needs and has the specific objectives of: (i) reducing infant mortality, (ii) improving the nutritional and health status of extremely-poor households, and (iii) reducing fertility.

The specific policy that I propose to reach these objectives is to create Help Centers[99] in charge of all directly targeted benefits for the extremely-poor. PASSPA should have four characteristics: first, location in areas with the highest poverty indices as computed by $P_j[(\alpha-1),z]$. Second, provision of nutritionally adequate foods, perhaps complemented by vitamins. Third, provision of free minimum quality but effective levels of preventive medicine and related education. Fourth, sustained provision of benefits; in particular, fiscal resources for PASSPA should be isolated from fluctuations associated with macroeconomic instability. I now discuss in more detail the elements of this proposal.

First, the argument to centralize the essential benefits for the extremely-poor under a single program derives from the complementarities discussed above. To reiterate, more food, by itself, may only have a transitory impact on the welfare of the extremely-poor, and will probably not eliminate extreme-poverty. Centralization of benefits also helps to minimize

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[99]Perhaps labelled Centros de Atencion a la Pobreza Extrema, or CAPEs. The proposal made here does not call for the creation of new institutions and organizations. A program with characteristics similar to the ones described here is already in operation. This is the Programa de Atencion de Servicios de Salud para la Poblacion Abierta, PASSPA (see World Bank, 1990c). Unfortunately, this program is at present very small. As I argue more fully in section VII.1, with some modifications PASSPA should be made the centerpiece of the fight against extreme-poverty.

costs (of time and transportation) to the recipients[100]. Moreover, simultaneous provision of the most elementary nutrition and health needs, if perceived as sustained by the extremely-poor, will make them feel safer and less vulnerable, allowing them to change their behavior, particularly with regards to fertility. Note that birth control methods, by themselves, can help reduce the number of unwanted children, but not the number of wanted children which, given the absence of alternative security arrangements, fulfill an economic need[101]. Making the extremely-poor feel comfortable with smaller families helps at the micro level by reducing the dependency ratio, allowing households to increase investment per child and resources per capita. It also helps at the macroeconomic level through a more fundamental process: reducing the rate of growth of the supply of unskilled labor.

Second, centralization of benefits can help solve an informational problem. Extremely-poor parents may not know that their children need to be vaccinated periodically against smallpox, measles and related diseases. These children stand a better chance of being inoculated if parents are informed about this need when they come to PASSPA for their food coupons (see below). Since food coupons provide incentives for parents to come to PASSPA, the marginal cost of time and transportation to bring their children would be almost nil. Centralization of benefits can also lessen the problem of intrahousehold inequality and help target food towards the young. There is no mechanism to deter the household head from re-selling the food obtained through the coupons (or allocating it inequitably within the household). However, by making food and health delivery joint, poor children, particularly infants, that are brought to PASSPA for inoculations and other medical

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[100] "Some of the most successful nutrition intervention programs have implicitly recognized complementarity of inputs and have linked food supplements to the provision of health. Such programs also increase the economic efficiency of staffing through administrative efficiency... Moreover, they reduce the unit costs for participants as such costs often include a major time investment in travel which is fixed per visit and not variable per service obtained" (Alderman, 1989, p. 25).

[101] "Households are not necessarily motivated to control their fertility; as we have seen, the poor in particular face many incentives not to restrict fertility. In countries where fertility rates are substantially higher among the poor than among the better off and where the poor constitute a large portion of the population, their high fertility pushes the countrywide average upward. This has been true of several Latin American countries, notably Brazil and Mexico" (Birdsall and Griffin, 1988, p. 45; emphasis in the original, S.L.).

services can be given food not normally consumed by adults (in addition to other food coupons provided for the household). Since undernutrition at an early age has lifetime effects, it is essential to improve nutrition of children (cf. Wolfe and Behrman (1982)). In this regard, an implication of the findings of section IV must be highlighted: since the number of extremely-poor individuals exceeds the number of extremely-poor households given that extremely-poor households are larger, it follows that children are heavily represented among the ranks of the extremely-poor.

Third, consolidating benefits for the extremely-poor can help minimize spill-overs into the non-targeted population. Monitoring is easier when it is done by a single agency. At the same time, the benefits provided by PASSPA should be of a quality that, while effective, also operate as a discriminating device: basic levels of preventive health and nutritious foods that are mostly consumed by low income households. Benefits to the extremely-poor would be targeted partly on the basis of the type of goods and services provided, partly on the basis of location, partly on evidence of direct need, and could be made contingent on behavior (see below). Improving living conditions should then provide an endogenous mechanism to phase out PASSPA. As the extremely-poor increase their income and access to normal education, the usefulness of some of the services provided by PASSPA would diminish; in addition, higher incomes should also translate into demand for foods not provided by PASSPA. The incentives of the relatively better off population to participate in PASSPA, while still there, would be reduced. Thus, PASSPA would not act as a disincentive to work. In particular, participants would not be told that if their income level increases their benefits would, pari passu, diminish. They would keep every additional peso earned.

Fourth, the needs of the extremely-poor call for sustained action. Since the extremely-poor are more vulnerable and risk-averse, their behavioral response, particularly with regards to fertility, is slow: stop-go programs of poverty alleviation only provide transitory welfare gains to the extremely-poor, but probably fail to change their behavior and allow them to 'get on their feet' in a permanent way. Moreover, it is obvious that 'good health' is the result of a cumulative process; unsystematic improvements in nutrition will not do. We must bear in mind that the benefits provided, while in the form of support to current food consumption and health, are fundamentally an

investment in human capital[102]. Thus, there are both behavioral and budgetary reasons for making reliability and sustainability key characteristics of PASSPA[103].

I next take up the issue of what mechanism should be used to deliver the food component of the basic package, in particular the choice between coupons (or food rations) or price subsidies for selected commodities[104]. A food ration or coupon allows a beneficiary to purchase a fixed amount of a particular food at a discounted price, and is an infra-marginal subsidy in the sense that any additional consumption of that commodity beyond the ration must be purchased at market prices. Clearly, this is equivalent to a direct income transfer given by the size of the ration times the price discount. In contrast, a price subsidy permits purchase of unlimited amounts of the commodity at the subsidized price, so that marginal amounts of the commodity are also bought at the lower than market price. The choice between these two has been analyzed by Besley and Kanbur in the realistic context where monitoring and information costs imply that perfect targeting is not feasible. In this context they argue that: "Intuitively, infra-marginal subsidies

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[102]The argument can be strengthened by pointing out that the present value of costs of programs that are temporarily cut and later resumed is higher than the present value of costs of programs that deliver the same benefits, but do so uninterruptedly. Not only are the administrative start-up costs borne twice, but also during the absence of the program the health and nutrition status of the extremely-poor can worsen, thus losing part of the ground gained before and requiring additional expenses to cover the same ground again.

[103]The need to insulate budgetary allocations for PASSPA from transitory macroeconomic fluctuations provides a further argument why direct benefits in poverty alleviation should be channeled only to the extremely-poor. Macroeconomic fluctuations may be beyond the control of policy makers (swings in oil prices, world interests rates, etc.), implying that government expenditures may at times need to be reduced. Political economy considerations aside, the temptation to cut government expenditures to the extremely-poor will increase with the fiscal cost of the program. Conversely, from the macroeconomic point of view it is easier to leave a program untouched in times of fiscal retrenchment if the program is, in relative terms, not so large.

[104]I center the discussion on food because other benefits delivered to the extremely-poor through PASSPA are significantly less marketable. Vaccinations, treatments for oral dehidratation and information about birth control, food preparation and hygiene can be delivered to individual beneficiaries with little risk of it being diverted to other uses or non-targeted beneficiaries.

transfer purchasing power independently of current income, while subsidies at the margin do so in proportion to current consumption of the commodity in question, and hence (to the first order) in proportion to income. For a given budget, therefore, infra-marginal subsidies are better at alleviating poverty. However, there may be administrative difficulties in achieving full coverage of the population, and there may be take up problems associated with individuals not going to ration shops because they thereby declare themselves to be poor. By contrast, a price subsidy....is comprehensive and reaches the whole population" (1988, pp. 711-12). Thus, the case for infra-marginal subsidies is built on the assumption that the extremely-poor could, if they wished, sell the rationed amount in the open market and translate the proceeds into income. From this perspective, food rations are simply a mechanism to transfer purchasing power to the target population, and the only arguments against them are the administrative difficulties, given cheating and other problems in identification of the target population and implementation of the rationing system. Price subsidies are a second-best way of reaching the same objective -transferring income to the poor- with their drawback being the higher costs associated with universal provision.

In this paper, however, I have made the case for delivering food to the extremely-poor not on the grounds of transferring purchasing power to them, but rather as part of a package of benefits of nutrition-health-education[105]. I have also argued against direct income transfers both on incentive and inter-temporal efficiency grounds. The PASSPA program should therefore not be primarily seen as a mechanism to transfer income to the extremely-poor (even though this is a beneficial and therefore welcomed by-product). From this perspective, the choice between coupons and price subsidies should be based on other considerations. For three reasons I argue that food coupons are preferable to price subsidies: one, to the extent that some of the foods provided with the coupons aimed at particular members of the household (like milk for children and lactating mothers) cannot be re-sold, the probability that these foods fail to reach the desired individuals given intra-household inequality is diminished; this may be particularly relevant in remote rural contexts where secondary markets for some food items may not exist. Two, to the extent that some of the extremely-poor, particularly in remote rural

[105]Note that the structure of the argument in Besley and Kanbur has nothing to do with food qua food. The same objective could be reached by subsidizing any other commodity consumed by the extremely-poor.

areas, do not purchase all the food they consume, the effectiveness of price subsidies is diminished, while the spill-over into the non-poor population is higher. Three, price subsidies are particularly undesirable in an open economy like the Mexican one, where subsidized food items can be exported to the benefit of foreigners[106]. Of course, price subsidies may only be given in selected stores, with targeting obtained through location[107]. If this is the case the budgetary advantage of coupons over subsidies is diminished, but not eliminated: since unlimited amounts of particular food items can be bought at the stores with subsidized prices, the incentives for arbitrage are still present, particularly in urban contexts where locational and transportation cost considerations are less relevant.

I now turn to the question of where PASSPA should be located. Besley and Kanbur (1988) exploit the decomposability property of the $P(\alpha,z)$ poverty index to derive regional rules for allocating resources for poverty alleviation. Assuming from equity considerations that minimizing national poverty is the objective, and that $\alpha = 2$ as discussed in section III.2, PASSPA should be located in regions where the income-gap ratio is highest, i.e., where $P_j(1,z)$ is higher[108]. The Besley-Kanbur rule takes the population of each region as given. An important consideration, however, is the extremely-poors' migratory

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[106]This phenomenon was actually observed during the 'oil boom' (1978-81), where large price subsidies implied that Americans close to the Mexican border would actually purchase their basic staples (and gasoline) in Mexico.

[107]The disadvantages of price subsidies can also be minimized through the type of goods subsidized, in particular, by subsidizing commodities where the highest share of total national consumption is consumed by the poor (which are not necessarily the commodities that have the largest expenditure share in the poor's budget). But note that there is no guarantee that these commodities will be adequate from a nutritional standpoint; there might be some foods which the extremely-poor are currently not consuming (because of lack of information, for example), but that policy makers may wish they do so.

[108]Using the notation of section III.2, Besley and Kanbur (1988) solve the problem:

$$\text{Min } P(\alpha,z) = \sum_{j=1}^{m} (n_j/n).P_j[(\alpha,z),b_j] \quad \text{subject to } \sum_{j=1}^{m} b_j = B$$

where the b_j's are the resources allocated to the jth regions, while B is the total budget allocated to poverty alleviation. The solution to the problem is to set $P_j[(\alpha-1),z] = \lambda$, a constant, for all j. This implies that "...if the objective is to minimize $P(\alpha,z)$ at the national level, then the region with the higher $P[(\alpha-1),z]$, (not the region with the higher $P(\alpha,z)$) should be favored at the margin" (op. cit., p. 707; emphasis in the original).

response to regionally unbalanced distribution of benefits. To the extent that extreme-poverty, as seen in section IV, is mostly a rural phenomenon, a strong case can be made to, without ignoring the urban extremely-poor, give preference to rural areas with the highest $P_j(1,z)$ indices in locating PASSPA[109]. This case is strengthened to the extent that transportation costs associated with remoteness could preclude some of the rural extremely-poor from benefiting from PASSPA; in relative terms transportation costs are lower for the urban extremely-poor[110].

Location of PASSPA together with the type of benefits provided would be part of the targeting procedure. But to help insure that benefits reach extremely-poor children, the possibility of making eligibility partly a function of compliance deserves consideration: delivery of benefits to adults (say, the food coupons) could be made contingent on their bringing their children periodically for innoculations and other type of medical attention.

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[109]Ravallion and Chao (1989) develop a numerical algorithm to apply the Besley-Kanbur rule under the additional constraint that policy makers cannot identify within each region who is poor and who is not, so that all individuals within a given region must receive the same transfer. They point out that: "In many LDCs one finds that the incidence of poverty, P(0,z), is higher in rural than urban areas. However, the relevant shadow price for minimizing P(2,z) is directly proportional to P(1,z) rather than P(0,z). Thus a low (although positive) incidence of urban poverty does not mean that the poverty minimizing allocation of aid between urban and rural areas will give a higher per capita transfer to the latter. Similarly, although the incidence of poverty may be many times greater in rural areas, it does not follow that the poverty alleviation budget should ignore urban areas. The average depth of poverty may be greater in urban areas, even if the incidence is lower" (op. cit., p. 218; emphasis in the original). Nevertheless, in their numerical applications for Bangladesh, Sri Lanka, Phillipines and Indonesia they find that "All of the results support the case for targeting policies towards rural sectors" (ibid, p. 223). Similar computations for Mexico are yet to be performed (and are high on the research agenda), but the results of section IV, together with the need to reduce migration incentives to the urban areas support the conclusion of the text.

[110]Of course, a proper implementation of the Besley-Kanbur technique requires finer disaggregation in the computation of $P_j(.)$ than the one presented in section IV. It is probably the case that even computations at the municipal level are insufficient to solve the locational problem. Thus, before this technique is implemented, there is a need for improvements in sampling design of the income-expenditure surveys, particularly in terms of coverage. The possibility of using the population census for this purpose could also be explored.

Sustained and effective operation of PASSPA-type programs is a substantial challenge; yet this will do the most to help the extremely-poor. Hence, there are strong arguments for concentrating government's policies for the extremely-poor mainly on this task, rather than spreading attention and resources over a wide variety of goals. PASSPA should be the central program that directly delivers benefits. This implies that the administration of most of the resources directly tied to extreme-poverty would fall under a single program, minimizing duplication and the possibility of government failure. Success of PASSPA is to be measured by their ability to lower infant mortality, reduce undernutrition, decrease fertility, reduce morbidity and improve elementary health and hygiene behavior. The program should have no other objectives. In particular, it should not have as objectives to directly reduce income inequality or regional disparities, nor should it have any responsibilities in the promotion of small scale agriculture, handicrafts or any other productive activity nor, finally, in the delivery of normal primary education.

VI.5 Development Policies for the Poor.

These should center on increasing the returns to land and labor, as well as on creating opportunities for the poor to improve their human capital and acquire financial assets (through education and improved access to credit and instruments for financial savings). This, in the end, is nothing short of the design of development strategies, a full discussion of which is obviously beyond the scope of this paper. In this sub-section I only identify the main characteristics that, from the point of view of the poor, future development strategies should have and, following the discussion of section V, focus mostly on issues of rural development and urban bias.

I begin by noting that Mexico has to be thought of as a land-scarce country. While some marginal increases in arable land can be obtained, population growth implies an unambiguous decrease in the country's land/labor ratio. The exhaustion of the extensive margin is a fundamental determinant of policies for the rural poor. I emphasize three implications. First, the rural poor should be able to allocate their land to any combination of activities that maximizes returns. Given differences in quality of land, weather, access to water and other factors, the use of land will clearly vary from region to region. Thus, it is not necessarily the case that land should be used for beans and corn; it may at times be better to use it for cattle-

grazing, agro-industrial activities, cash crops, export crops or what have you. There is one corollary of this: maximizing the returns to the land owned by the poor is not equivalent to increasing the output of food, particularly basic cereals. Rural development with the view to reduce poverty should not be equated to the problem of increasing the supply of food[111].

A second implication is that, given population growth, the share of rural poor accounted for by landless peasants will increase. Differently put, rural labor markets will become even more important. Unless the earnings of unskilled rural labor increase it is difficult to foresee a reduction in poverty. Outward shifts in the demand for rural labor and improvements in the operation of the rural labor market are essential to reduce poverty. To achieve this, policy should insure that: (i) the private cost of labor reflect its social opportunity costs, (ii) any regulation (be it limits on land use, credit, output and input prices, tenancy arrangement) that limits the demand for unskilled rural labor be eliminated, (iii) transport and communications infrastructure be developed to reduce costs and permit easier migration, decentralization of some urban activities and reduction of search and information costs.

The third implication is that agricultural growth will be forthcoming only through a switch towards high value crops and greater yields. But growth along the intensive margin requires three key inputs: one, investments in roads, irrigation, and research. Two, efficient institutions for credit, marketing and insurance that permit more intensive use of fertilizers, double cropping, switches towards high yielding varieties and the like. Three, more entrepreneurial effort to make the myriad of microeconomic decisions that agriculture requires[112].

To put the matter differently, rural development in the 1990's should be seen as more than agricultural development, and the latter should be seen as

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[111]Differently put, 'autosuficiencia alimentaria' may be a too costly non-economic objective which, in addition, is principally paid for by the rural poor. Free trade in agricultural goods would allow a decoupling of the production decisions in the rural areas from the consumption decisions of the whole population; part of the relevance of a potential free trade agreement between Mexico and the United States should be seen from this angle.

[112]Timmer (1988, pp. 290-300) provides a good discussion of why given factors that are particularly important in agriculture (e.g. weather risk) the incentive structure plays a central role for effective decision making.

more than increasing the output of basic grains. The rural poor can be helped the most by a flexible and dynamic rural sector engaged in a multiplicity of activities that vary from region to region according to climatic conditions and quality of land, but that also adapts easily to changing world prices, tastes, new markets (domestic or foreign) and new technologies. Scarce land must be used for the most profitable activity, with increased rural production in many activities and greater rural incomes translating into higher wages for rural labor.

Yet, as seen in section V.1, rural development is hindered by institutional regulations that promote inefficient uses of land, depress the demand for unskilled rural labor, and reduce the incentives for private investment. Moreover, attempts to solve the underlying difficulties only by increasing resources have resulted in large untargeted subsidies that have failed to raise the rate of growth of output, have probably failed to increase incomes of the rural poor and have given rents to higher income producers. At present development of the rural areas to help the poor imposes two requirements on policy makers: one, modify the institutional and regulatory regime. Two, change the form in which resources are channeled to the rural areas. I discuss each in turn.

I remarked in section III that poverty programs in the 1990's should be congruent with the direction that overall economic policy has taken. Yet a comparison of the regulatory nature of the regime in the rural areas vs. the rest of the economy shows a sharp imbalance. And while, after the macroeconomic stabilization has been consolidated, it is reasonable to expect further private investment in manufacturing and services, the opposite is true of the rural areas. This would: (i) put all the budgetary burden of rural development on the government, which it cannot afford, and (ii) commit the government to undertake detailed microeconomic decisions. This situation is at odds with the regulatory nature of the environment in other parts of the economy, incongruent with the overall direction that economic policy has taken over the last few years, and has failed to produce results in the past.

Recent reforms in the rural areas have recognized some of these problems. Individual ejidatarios can now receive credit on their own (thus solving the free rider problem); virtually no credit is to be given in kind; operational rules for Banrural are being modified. These reforms are important steps in the right direction. But they are not enough. To have a greater impact in

reducing rural poverty it is still necessary to: (i) make sure credit is not contingent on crop choice and is not used as a consumption subsidy; (ii) legalize ejido parcels that are under 20 hectares to reduce uncertainty of eviction; (iii) legalize renting of ejido land, sharecropping, and joint operations between ejidatarios and private producers; (iv) clarify the laws with regards to the use of private lands, while eliminating restrictions on the use of given plots of land[113].

Furthering the process of rural reform is essential; moreover, channeling additional resources to the rural areas in the absence of institutional reform will be insufficient to help the rural poor. To reiterate, from the point of view of the rural poor who do not own land, the key issue is what is done with the land by those who do own it; land distribution and land regulations matter only to the extent that different distributions and regulations imply different derived demands for unskilled labor, with different characteristics with regards to risk, location, seasonality and wages. On the other hand, from the point of view of the rural poor who do own land, what matters is their ability to exploit this asset in the most flexible way, either through sharecropping and other arrangements, or through the choice of crop, source of credit and fertilizer, or marketing and insurance mechanisms.

The way in which resources are channeled to the rural sector must also be reformed. In particular, subsidies to input and output prices need to be eliminated. If indeed over the medium term the rural poor are helped the most by an efficient and flexible rural sector, then input and output prices should be used for efficiency. If the rural areas are to be integrated into the rest of the economy not only must the institutional and regulatory regime be similar, but relative prices should also perform the same allocative and

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[113]I emphasize that, to the extent possible, I center the discussion only on the economic aspects of the institutional regime. It is clear that the land tenure system and other regulations in agriculture play multiple roles which policy makers must also consider. Still, policy makers need to be clear about the economic costs of these regulations, as well as the people who bear the brunt of those costs. On the other hand, as discussed in section V.1, it is very difficult to tell exactly which of all regulations are most responsible for the slowdown in agricultural growth. Thus, it appears prudent to center attention on those regulations whose reform is essential for further rural development. The existence of rental markets for ejido land together with changes in credit regulations might be compatible with the inalienability of ejido land.

informational functions that they currently perform in industry and services. Since a substantial part of the land can in principle be used to produce tradeable goods, a strategy of maximizing the returns to land should, to a first approximation, take world prices as the relevant opportunity costs[114]. Guiding resource allocation and valuing inputs and outputs in the rural sector by world prices will allow the rural areas to benefit, just as industry currently does, from policy actions that increase the profitability of tradeable output.

The rural areas do need more resources. But these resources must aid the development of agriculture along the intensive margin, and facilitate the integration of the rural sector into the rest of the economy. Alternatively, substantial resources need to be devoted to the development of the rural infrastructure, with emphasis on rural roads, irrigation, and research and extension services. Better roads help the rural poor since they: (i) lower costs and increase frequency of delivery of goods imported from the urban areas, (ii) reduce migration costs, (iii) reduce costs of transportation to and from urban areas allowing decentralization of productive activities (see below), (iv) facilitate switches towards high value crops (vegetable, flowers, fruits) that depend on rapid marketing, and (v) give faster access to fertilizers. Irrigation helps the rural poor since it: (i) increases yields, (ii) reduces weather risks, (iii) increases crop choice, and (iv) reduces land left fallow[115]. Research and extension services help the rural poor by: (i) developing high yielding varieties for the specific climatological conditions of each region, and (ii) reducing costs of information and risks of innovation. In sum, resources must be redirected from price subsidies (to credit, inputs and outputs) where they are mostly appropriated by the non-poor, to areas where the externalities are greatest and the probability of reaching the poor is higher.

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[114]Issues like monopoly power in trade, uncertainty, etc. may call for some trade intervention. This requires a case by case analysis.

[115]"In a country where a large proportion of the total area is arid or semiarid, where a large area is mountainous with slopes too steep for cultivation, and where a considerable area is subject to excessive rainfall causing erosion and flooding, the amount of land which can be cultivated successfully without artificial aids is relatively limited, and that is why irrigation has played, and will continue to play, such a vital role in Mexico's agriculture." (Yates, op. cit., p. 68).

But reform of rural institutions and more infrastructure is insufficient to help the rural poor. A third area requires policy makers' attention: elimination of urban bias in the delivery of social services. The rural poor also need to improve their human capital through health and education. This implies not only tilting the balance of social spending towards the rural areas, but also allocating those resources where their social pay-off is high. In the short run improvements can be made by increasing attention to preventive medicine and bettering the quality of primary education. These are, again, the areas where the risks that the benefits will be appropriated by the non-poor are smaller and the externalities higher[116].

Rural development is the key to poverty alleviation: this is where most of the poor are, and this is where in the short run growth is most needed. But what about the medium term? Can rural wages increase sufficiently to reduce poverty in the face of growing population? This is a difficult question to answer, but two points can be made. First, it is clear that over a longer time-span rural wages will increase only by increasing the land/labor ratio, which implies the need for further rural ıt migration. Second, however, given present distortions in input and output prices, land use and land tenure, it is very difficult to tell how much rural wages could increase in the short run if these distortions were removed[117]. Differently put, reform of the rural areas may allow for substantial increases in rural wages and reduce for some time the incentives for rural-urban migration

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[116]Issues of urban bias also call for decentralization of fiscal collections and switching of responsibilities from the federal to state governments; I abstract from these issues in this paper, but see World Bank, 1989a, for further discussion.

[117]In fact, the information problem is quite severe. Under the present set of regulations it is very difficult to tell what is the comparative advantage of the rural areas. It is plausible to argue that given Mexico's endowments this would be in crops with high value per unit of land and low value per unit of labor. But issues like access to marketing, weather uncertainty and the like are also central. (This provides yet another reason why the government should not take decisions with regards to the output mix; this should be decided by individual producers who have the incentive and ability to gather this information.)

(particularly if accompanied by the removal of urban bias in social spending)[118].

Eventually more urbanization will take place. But its shape will depend on the spatial pattern of relative prices, and can thus be influenced by policy. Further urbanization can occur through the growth of small and medium size cities in the more rural states. Shifting population to these urban areas will allow economies of scale in the delivery of certain services (hospitals, higher education), and will create further employment opportunities in these states; today's rural poor do not have to be tomorrow's urban poor. But to achieve growth of small and medium size cities in rural states it is essential to eliminate current subsidies to the large metropolitan areas. Differently put, as part of a program of rural development there is also a need for spatial correction of relative prices so that private firms face marginal costs in the large metropolitan areas that are equal to social costs. This will: (i) liberate large resources currently devoted to expand the infrastructure of those areas, (ii) induce private producers to decentralize some production activities and, in turn, (iii) increase labor demand and, more generally, incomes in small cities in relatively more rural states (particularly if this is accompanied by infrastructure development in those states). Serious consideration should be given to the introduction of location taxes in the large metropolitan areas.

To recapitulate. The core of the poverty program suggested consists of: (i) implementation of PASSPA-type programs with a clear focus on the extremely-poor, (ii) reform of the regulatory and institutional regime in the rural areas, (iii) elimination of price subsidies and redirection of those resources to develop the rural infrastructure, (iv) elimination of urban bias in the delivery of social services, and (v) correction in the spatial pattern of relative prices. This approach combines directly targeted benefits only for the extremely-poor with a strong emphasis on allocative efficiency, is

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[118] Yates, op. cit., p. 61 notes that "..a great deal of marginal land is being cultivated by people who have no alternative means of livelihood." But note that even if these lands are eventually abandoned, these people need not migrate immediately to urban areas. As mentioned, it is difficult to tell ex-ante what rural employment opportunities would be under a very different price and incentive regime. Whether these peasants on marginal lands 'abandon their land' or not is not the key point. Rather, it is whether with more rural development they have greater opportunities to diversify and increase their sources of income.

congruent with the overall direction of economic policy, treats the rural areas in the same way as the rest of the economy, allocates land as any other productive asset, and considers that rural inhabitants, just like urban, have a continuum of abilities and labor-leisure trade-offs. This approach does not imply that 'getting prices right', by itself, will eliminate poverty; it does imply that 'getting prices wrong' does not help the poor. The poverty program suggested gives a large role to the government. But it concentrates government action in areas where the government has comparative advantage: helping directly only those who need help and helping indirectly all others by setting the right incentive structure, attacking externalities and allocating social expenditures equitably, all in the context of a stable macroeconomic environment.

VII. Government Programs for Poverty.

Poverty alleviation efforts in Mexico are coordinated and supervised by the Programa Nacional de Solidaridad (Pronasol), initiated by the Salinas Administration in December of 1988. Pronasol is an umbrella organization with the aim of developing health, education, nutrition, housing, employment, infrastructure and other productive projects targeted on the poorest groups. Since its inception the program has grown both in terms of size (as measured by expenditures), and in terms of the programs it encompasses. At the time of writing, Pronasol is still adapting existing programs and developing new ones; changes are also being made within the different government agencies responsible for implementing various poverty alleviation efforts. In what follows I concentrate only on giving a description of the main programs (sub-section VII.1) and, in the light of previous results, offer some suggestions for improvements (sub-section VII.2).

VII.1 Description of Current Programs.

Pronasol covers a wide range of activities through different specific programs. Broad participation of the beneficiaries is sought in setting priorities. But at the same time, beneficiaries are made responsible for results and, depending on specific program characteristics, are at times expected to co-finance projects with own resources. Decision-making and implementation is in principle expected to be the joint effort of the government and program participants. To provide a brief description of Pronasol specific activities, it is useful to classify them in four broad areas: 1. food support programs, 2. productive programs, 3. social services programs, and 4. infrastructure programs.

1. Food Support Programs[119]. There are four mechanisms through which the government provides food support: (i) general subsidies, (ii) targeted coverage for the urban poor, (iii) targeted coverage for the rural poor, and (iv) targeted coverage for vulnerable groups. The total cost of these programs in 1988 was about (US) $ 900 million, out of which about 500 million went to the first category. Preliminary figures show that in 1989 1,400 million was spent on these programs, with about 900 million allocated to untargeted subsidies.

[119]The following discussion is based on World Bank (1990a).

Targeted coverage for the urban poor is attempted by selling fixed amounts of two food items, tortillas and milk, at subsidized prices to families who earn less than 2 minimum wages[120]. In principle it is expected that, for a family of five with 2 children, these two food items provide 1070 calories and 32 grams of protein per person per day. Practice may be different: first, poor households tend to be larger than five, and second, even if the total is right, intrahousehold allocations may be such that individuals fall short of that target. In 1988 the tortilla program covered approximately 1.08 million families with a 90% price discount transferring about $ 95 dollars a year (assuming the fixed amount of two kilos of tortillas per day per family were actually bought)[121]. The milk program covered 1.86 million families who were screened by social workers to qualify (and automatically became eligible for the tortibonos) and, depending on the number of children, obtained varying quantities of milk at an 80% price discount[122], with an average savings of $ 50 dollars per year. The total cost of these two programs was $ 195 million.

Targeted coverage for the rural poor is attempted through a system of rural stores operated by the government's food marketing and distribution agency, Conasupo, where basic staples are sold at an average price discount of 14%. The stores are in principle accessible to 5.1 million families, with targeting achieved (in principle) by location. The total cost of the program in 1988 was $ 51 million, providing an average savings per family of $ 10, although this figure is only an estimate, since there is little information on who actually purchases there, and how much.

Targeted coverage for vulnerable groups is carried out by various other institutions, and basically falls under two programs. One, the "Nutrition and Health Program" run as part of PASSPA jointly by the Ministry of Health, the Mexican Institute of Social Security, the National Institute of Nutrition and

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[120]These are the so-called 'tortibonos' and 'Liconsa' milk programs.

[121]As of March 1991 the 'tortibono' progam will be replaced by the program 'tortilla solidaridad', where one kilo of tortilla per day will be freely distributed to any family earning less than twice the minimum wage.

[122]Families with up to 2 (3, over 4) children can purchase 8 (12, up to 24) liters of milk per week.

the National Indigenous Institute. This program provides free food[123], health and nutrition education, and basic health coverage. It targets families living in areas of acute poverty (identified by some 'socioeconomic criteria' like housing, access to water, etc.) with between 500 and 2500 inhabitants[124]. To qualify for the program families must meet one of the following criteria: have pregnant or nursing women, allocate 60% or more of total expenditures to food, lack drinking water or waste disposal, or have less than 6 years of schooling. In 1988 this program helped 215,000 families, at a total cost of 1.7 million. Two, the Sistema Nacional para el Desarollo Integral de la Familia (DIF), who in turn operates various programs[125], that provide free rations of food items[126] based again on some 'socioeconomic indicators' (education, housing). The DIF programs covered 1.1 million families in 1988, spending about $ 100 dollars per year per family.

2. Productive Programs. These are programs through which Pronasol seeks to directly increase the poors' earnings potential. They fall under three categories. One, the Fondos de Solidaridad para la Produccion, (Solidarity Funds for Production), which so far has concentrated in providing credit to farmers that because of their characteristics (high-risk, low yield activities) cannot obtain it from public or private institutions. In 1990 400,000 farmers in 1,350 municipios were provided with credit at zero interest rates. It is assumed that this credit contributed to cultivate 1.8 million hectares. Credit is granted directly to each producer, and is not tied to crop choice.

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[123]193 grams of powdered milk per day to urban families, and 300 grams of corn in grain, 200 grams of beans and 200 grams of wheat flour per day to rural families.

[124]Although it appears that these 'socioeconomic indicators' are based on the 'index of marginalization' constructed by Coplamar (see the discussion in section III.2).

[125]The two main programs operated by the DIF are the PROENI, targeted on children under four years of age, and the PASAF, targeted on households with pregnant and nursing mothers, elderly and handicapped.

[126]Poor families with at least two members who are either less than 5 years of age, pregnant or nursing, or elderly and handicapped receive 5 kilos of corn flour and 5 kilos of beans per month if they live in urban areas, and 8 kilos of corn and 2 of beans if they live in rural areas; in addition, children between 4 and 12 years of age receive 5 rations per week consisting of 0.2 liters of milk, bread and a dessert.

Two, the Fondos de Solidaridad para las Comunidades Indigenas (Solidarity Funds for Indigenous Communities). This program channeled 20 million dollars in 1990 to 50 different ethnic groups located in 80 regions. Funds were channeled directly to the communities' organizations, who decided the priority and specific use of resources. Three, the Programa de Mujeres en Solidaridad (Women in Solidarity), that provides resources to women so that they can support their household income through productive work.

3. Social Services Program. These consist of support to health and education. In the area of health Pronasol helped establish 727 new clinics, and the re-habilitation and expansion of 26 hospitals.

In education Pronasol has dedicated efforts to the re-habilitation and improvement of 34,000 schools in 1990 (through the program Solidarity for a Dignified School). It has also instituted a program aimed at reducing primary school drop-out rates. The program grants scholarships to children, and provides their families with health and food support through the provision of food baskets. Finally, Pronasol also provides scholarships to young high school and university graduates who participate in its activities. In 1990 115,000 graduates received such scholarships.

4. Infrastructure Programs. Through these programs Pronasol supports development of the infrastructure in poor communities. The program Fondos Municipales de Solidaridad (Municipal Solidarity Funds) channeled resources to 1,426 municipalities in 13 states during 1990 to attend 'urgent investment needs' as determined by the municipalities. Efforts are also directed to determine and clarify ownership rights in urban squatter areas. Through these programs electricity was also provided to 3,557 rural communities and poor urban nieghborhoods; improved water supply was provided to 700 urban communities. In addition, efforts were directed to re-capitalize and re-habilitate urban and rural government food stores. Plans call for Pronasol's participation in the construction of rural roads as of 1991.

VII.2 Preliminary Assessment.

A complete assessment of Pronasol is difficult: first, because many of Pronasol's programs have just begun and their operational rules are still under revision; and second, because the relevant data is unavailable. For these reasons, the evaluation and suggestions made here are preliminary, and focus mostly on methodological issues, leaving matters that require empirical work for a later occasion. To focus the discussion, it is useful to consider the impact of food and nutrition programs, on the one hand, and the other programs, on the other.

Directly Targeted Food Support Programs.

There is a strong case, as argued in section 3.4, to focus direct targeting of benefits only on the extremely-poor. At present, however, various criteria are used to identify the beneficiaries of the food and nutrition support programs. Some programs (like the tortibonos and the Liconsa milk) identify the poor using the minimum wage as the relevant statistic. Others (like PASSPA) use a mix of location, spending and educational characteristics. And yet other programs use the indice de marginalidad computed by Coplamar[127]. Identification of the extremely-poor is of course no simple matter. On the other hand, the use of different indicators to identify what should in principle be the same target population may lead to mistargeting of the truly needy. To improve upon targeting criteria a strong case can be made to use a systematic poverty indicator.

Unfortunately, current problems with data availability preclude the use of a poverty indicator with the desired properties like the one suggested in section 3.1[128]. Until such data limitations are surpassed, improvements could

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[127]At times it is not clear whether the indice de marginalidad used is the one computed by Coplamar (as discussed in section III.2). Sometimes mention is made of another index computed by Conapo (Comision Nacional de Poblacion). I was unable to obtain information on the latter index, although it seems to be related to the former.

[128]Note also that a systematic attack on poverty needs information to evaluate progress. To be able to calculate the desired poverty indices, and to monitor progress in poverty alleviation, future IES should have larger samples that allow for statistical inferences in the urban and rural areas of each state. In addition, data needs to be gathered on a more regular basis, with fixed periodicity (say, every four years).

be made unifying indicators for targeted programs. A suggestion would be to calculate the line of extreme-poverty in, say, prices of January of 1991, and then compute a relevant price index to up-date it and keep it constant in real terms. This (real) poverty line could substitute for the minimum wage as a discriminating device. This is a desirable change, as the real minimum wage is subject to discrete jumps derived from transitory macroeconomic disturbances. (Of course, regional poverty indices could be computed if regional differences in price levels require such distinction.)

The tortibono and Liconsa milk programs are a clear improvement over previous programs. Not only is the support targeted (at least in principle) only on the poor, but because of the infra-marginal nature of the transfers, distortions in consumer choice are avoided. On the other hand, it is clear that the basic effect of these programs is to transfer purchasing power to the (mostly urban) poor. Incentive issues aside (see below), it is important to point out that such income transfers: (i) fail to exploit the complementarities between food, basic health and information discussed in section VI.4, and (ii) do not address problems of intrahousehold inequality. The first problem may not be an important issue in urban areas to the extent that in these areas fixed costs of access to health services may be much lower, and information about birth control, water and food treatment, etc. more readily available. Under these circumstances, transfering income to the urban extremely-poor may allow them to purchase those complementary health and educational services on their own.

But the same is not true of poor rural areas. In these areas the supply of information about fertility control, food conservation and basic health care, as well as the actual services themselves, is likely to be deficient, while transport costs are much higher. These circumstances effectively preclude the rural poor from translating the income transfered through the food support programs into better health, more fertility control, more inoculations for their children, and better food preparation and conservation. Thus, the effectiveness of income transfers through food support programs is likely to be much lower in these areas. Because reducing undernutrition, fertility, infant mortality and morbidity is the key objective for the extremely-poor, a strong case can be made for making PASSPA-type programs the centerpiece of efforts to help the extremely-poor (both in terms of resources and emphasis), with particular emphasis on the rural areas. This requires

changes in resource allocation, as PASSPA is the smallest of all the food and nutrition programs currently in place.

The estimates of purchasing power currently transferred to the targeted groups through food support programs show a bias against the rural areas. The Conasupo rural stores carry an average benefit of $ 10 a year per family (assuming only poor families have access to them!), while an urban family who participates in both the Liconsa milk and the tortibono programs can potentially receive up to $ 145 annually. This is not only inequitable given the distribution of extreme-poverty between rural and urban areas (recall from table 7 that between two-thirds to three-fourths of total extreme-poverty is accounted for by rural regions), but perpetuates the incentives to migrate to the urban squatter areas[129]. Differently put, the current pattern of directly targeted benefits is rather different from what one would like to see. This is not to argue that benefits to the urban areas should be reduced, but to point out, rather, the need for additional benefits for the rural poor. It may be relatively more difficult to have benefits reach the rural poor, but this is what a 'frontal attack' on poverty requires. Moreover, the rural-urban imbalance is exacerbated by the mix of rationing coupons and generalized price subsidies. The tortibono and Liconsa milk programs in the rural areas work with coupons, while the Conasupo rural stores offer price discounts. Clearly, there are non-poor inhabitants in the rural areas who might be benefiting from the price subsidies. Thus, it is not clear that the few resources channeled to the rural areas reach only the extremely-poor.

The distribution of resources devoted to food support also appears somewhat unbalanced. Out of the $ 900 million spent on food support programs in 1988, more than half, or about $ 500 million, were allocated to untargeted food subsidies. The World Bank (1990a, p. 6) estimates that more than 80% of these subsidies go to families who earn more than 1.5 times the minimum wages. This implies, roughly speaking, that of a total of $ 900 million spent on food and health support by the programs described above, only about $ 500 million benefit the extremely-poor[130]. From the point of view of alleviating extreme-

[129]Torche (1990, p. 25) points out that 55% of the beneficiaries of the tortibonos program live in the Federal District and surrounding metropolitan area.

[130]Assuming all 400 million allocated to the targeted programs indeed reach the extremely-poor, and adding to this figure 20% of the 500 million spent on untargeted food subsidies.

poverty there is no case for the $ 400 million spent on untargeted food subsidies. Alternatively, in 1988 there were potentially up to $ 400 million that could be re-directed to benefit the extremely-poor. Contrast this figure with the $ 1.7 million spent in the same year on PASSPA.

Note that to the extent that some food support programs have as their chief effect the transfer of purchasing power to the population, a negative effect on incentives may be introduced. This problem arises when transfers are means-tested, as is the case in the urban areas where the tortibono and Liconsa milk programs are in place. Because such programs transfer benefits only if the income of participants is less than twice the minimum wage, participants will notice a decrease in net income as earned income increases beyond this point (see the discussion of section VI.2). This effect may be re-inforced if access to other benefits (like public housing) is also contingent on incomes being lower than the same cut-off point. Clearly, avoiding the negative effects of means-tested targeting is difficult. Their operational importance, on the other hand, depends on the size of the benefits and the specific form in which the program is implemented. But as generalized subsidies are replaced by means-tested targeting, it is important to be aware of the trade-offs between the budgetary advanatges of targeting and its possible incentive disadvantages. This suggests the need to gather and analyze data characteristics and frequency of benefits by households to assess the importance of this issue.

Productive, Social and Infrastructure Programs.

Pronasol's activities in infrastructure development are very important. Rural roads, electricity, the re-habilitation of schools and hospitals and similar investments are essential to reduce transport costs, increase mobility, access to information and to possibilities to improve human capital. Moreover, small infrastructure investments that incorporate the beneficiaries in the identification and implementation of projects have higher likelihood of success: the beneficiaries have more information about their underlying needs, and higher stakes in the projects' outcome. Yet it is important to note that as Pronasol extends its reach into other areas it may lose some of its focus and, in an attempt to rapidly act in many areas may unintentionally bias the incentive structure in subtle but nonetheless important ways.

Consider, for example, Pronasol's scholarship-cum-food package program to reduce primary school drop-out rates. A double rationale can justify this program. First, as discussed in section VI.1, poor parents may not be able to afford the opportunity cost of sending their children to school (because of reduced labor input in the family farm, say). Second, undernourished children will underperform even if they systematically attend school. Ignoring intra-household inequality, Pronasol's programs can work on these two margins, and allow parents to make the investment in ther children's education, a very desirable outcome. On the other hand, care must be exercised during implementation. If the value of the scholarship-cum-food package is too high (relative to household's costs of sending children to school), parents may respond to the program by increasing family size as additional children become, at the margin, more valuable. Thus, the program could run counter to other efforts aimed at reducing fertility. In practice this effect may not be that important, but its mention calls attention to a relevant issue: the need to gather detailed data on the characteristics of the program so that its short and medium term effects can be fully assessed.

A similar phenomenon occurs with the program Solidarity Funds for Production. Given current changes in the regulations to rural credit institutions, a program that provides credit to poor farmers can play an essential role isolating and protecting these farmers from the transitional disturbances associated with such changes. Over the medium term, however, the implications of providing credit at zero nominal interest rates (and hence negative real rates) must be determined, and the negative effects of this type of production subsidy on farmers' choice of technique must be evaluated. Again, the importance of this issue at this point is difficult to determine and, as with other programs, data on amounts of credit, default rates, output and input choices, etc., is required to determine the impact of the program, and of any changes it may need.

Summing Up.

The government's recent efforts at poverty alleviation are very welcome indeed. In spite of the stringencies imposed by the macroeconomic stabilization program, more resources are being channeled to the poor. This is a significant achievement. The programs through which resources are being channeled, moreover, appear to be, on the whole, well designed. The replacement of generalized price subsidies by targeted programs, and the

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emphasis on social and infrastructure investments in poor regions are all effective means to reach and help the poor.

There are, however, improvements that can be made within this general effort. Targeting of direct benefits needs to focus more on the extremely-poor, and the form of the benefits needs adjustment. Firstly, there remains an imbalance between urban and rural areas; an imbalance that needs to be resolved by channeling more resources to the rural areas, not reducing them in urban areas. Secondly, the effectiveness of the resources channeled to the rural areas needs to be enhanced. In particular, programs that exploit the complementarities between health, nutrition and information need more attention, since in rural areas such complementarities cannot be achieved by simply transfering income to the extremely-poor. Thirdly, resources and administrative constraints imply that much can be gained by focusing Pronasol's attention more on its key programs than is currently the case.

In addition to its own significant merits, a high-visibility program can be very valuable in strengthening the social consensus behind other structural changes, and can be a central element in showing that such changes will not be allowed to increase poverty. But the risks of such a program deserve mention as well. A key risk may derive from the impression that Pronasol, by itself, is sufficient for poverty alleviation, and that other policies can be freed from poverty considerations. Given the extent of poverty in Mexico, investing one or one and a half percent of GNP on Pronasol will not have a sufficient impact. But the focus should not only lie in allocating larger resources to Pronasol, but also in directly confronting the roots of poverty. In this paper I have argued that primary poverty in Mexico is the result of institutional structures and interventions in resource allocation mechanisms that generate market outcomes which undervalue the resources owned by the poor. Over the medium term, the greatest impact on poverty alleviation will derive from institutional reforms that tilt market outcomes to benefit the poor. Efforts at reducing generalized price subsidies, at reforming rural regulations, at eliminating urban bias, and at macroeconomic stabilization have been at the center of the government's agenda over the last few years with, quite naturally, varying levels of accomplishment so far. But unless the reforms to these primary determinants of poverty are pursued further, Pronasol's activities, while undoubtedly very valuable, will, so to speak, be like 'swimming against the current'. Only when policies for the poor become an integral part of the development program of the country, will the poor be

removed from the status of minor participants in development to the focus of development.

VIII. Conclusions.

VIII.1 Summary of Results.

I summarize very schematically the key points of the paper:

1. A distinction between moderate and extreme-poverty is required. The moderately-poor lack some goods and services that given the country's wealth everybody should enjoy. The extremely-poor have such low resources as to be at risk of undernutrition, with higher morbidity and potential anthropometric deficiencies.

2. Undernutrition and malnutrition should be separated. There are significant difficulties in the measurement of undernutrition. Most estimates of undernutrition in Mexico are based on the comparison between exogenously given intakes and prescribed requirements. These estimates are probably flawed and overestimate the extent of the problem.

3. Indicators of poverty should incorporate concerns about its severity and distribution; the head-count ratio fails to do this, as do other 'indices of marginalization' computed by government agencies and currently used to identify the poor. The Foster-Greer-Thorbecke poverty index $P(\alpha,z)$ satisfies axioms with respect to severity and distribution of poverty, can be separably decomposed, allows measurement of the contribution of each region to total poverty, can serve to rank regions for delivery of benefits, and can be used to monitor progress in poverty alleviation. The index takes as exogenous the poverty line z and a parameter α that measures societies' concern for the poorest of the poor. A distinction was made between a line of extreme-poverty, $\underline{z}$, and a line of moderate-poverty, $\bar{z}$. The monetary cost of each was estimated.

4. Based on the 1984 Income-Expenditure Survey I find that: (i) at most 19% of the population is extremely-poor, although it is probably the case that this is an over-estimate, (ii) not only is extreme-poverty mostly a rural problem, but the poorest of the extremely-poor are rural, (iii) the extremely-poor have larger household sizes, more children and the highest dependency ratios, (iv) not even the extremely-poor allocate more than 60% of total monetary expenditures to food.

5. Three main determinants of poverty were identified: (i) institutional arrangements - government policies within the rural areas that discriminate against the poor, (ii) urban bias, and (iii) macroeconomic uncertainty. The ejido cum-private land tenure structure, together with other regulations and policies fail to increase agricultural output, deliver substantial rents to high income agricultural producers, and depress the returns to land and the demand for unskilled rural labor, the two main assets owned by the poor. Urban bias in the allocation of social and infrastructure spending reduces the rural poor's ability to increase their human capital, while macroeconomic uncertainty and stop-go cycles depress the permanent demand for unskilled labor and the steady stream of social spending.

6. Policies to alleviate poverty must take as departure point the needs and characteristics of each group. As opposed to the rest of the population, the extremely-poor have: (i) lower ability to bear risk, (ii) higher fertility, (iii) higher (cross and direct) price and income elasticities of demand for food, and (iv) higher age-specific participation rates. In addition, household inequality is potentially more important at such low income levels. The moderately-poor are in a qualitatively different category and can: (i) participate more fully in the labor market, (ii) migrate, and (iii) benefit from educational opportunities. The needs of each group are different.

7. Government interventions to alleviate poverty must consider intertemporal, information, incentive and administrative constraints. Intertemporal issues matter because poverty alleviation programs must balance direct consumption benefits today vs. investments that allow the poor to increase their income tomorrow. Information issues matter since identifying the poor is difficult and costly. Incentive issues matter since poverty programs should not create a class of welfare dependents. Administrative constraints matter since risks of corruption and government failure increase with the number of programs.

8. As opposed to the moderately-poor, there is a case for directly targeted benefits for the extremely-poor. This does not imply that no resources should be spent on the former group; it implies that resources should be devoted to investment. A poverty program has two separate tasks: (i) directly targeted benefits to the extremely-poor to reduce fertility, morbidity, undernutrition and infant mortality, (ii) institutional reforms and allocation of government resources to increase the permanent demand for unskilled labor, the returns to land, and access of the poor to education and social infrastructure. This

approach to poverty is congruent with the overall direction that economic policy has taken over the last few years, and concentrates government's attention in well-defined areas.

9. Policies for the extremely-poor need to exploit the complementarities among nutrition, health and education. More food by itself will only give transitory benefits to the extremely-poor; it will not allow them to eventually get on their feet and work their way out of poverty. Directly targeted benefits for the extremely-poor must consist of a basic package that simultaneously delivers selected foods, preventive health and education about hygiene, birth control, food preparation and conservation and the like. In addition, benefits to the extremely-poor must all be under a single program that: (i) centers attention in regions with the highest $P_j[(\alpha-1),\underline{z}]$ indices, (ii) provides sustained benefits, and (iii) delivers food through coupons rather than price subsidies. Food pricing policies should be divorced from poverty considerations.

10. Development policies to help the poor must focus: first, on institutional reform of the incentive structure in the rural areas. Second, on changing the way in which resources are channeled to the rural areas eliminating price subsidies and increasing investment in rural roads, irrigation, extension services and the like (i.e., in areas where the externalities are the greatest). Additional resources to the rural areas in the absence of institutional reforms will not help the rural poor; moreover, the focus of reforms should be to promote rural development, which should not be equated to an increase in food supply, particularly of basic cereals. Third, on eliminating urban bias in the allocation of social and infrastructure spending. Fourth, on bringing private costs of production in the large metropolitan areas, particularly Mexico City, in line with social costs.

11. Current government programs for poverty alleviation represent an significant step forward. Pronasol's key programs appear to be well designed. On the other hand, adjustments are still required: (i) more resources need to be channeled to rural areas, (ii) more emphasis is required on programs that exploit the complementarities between information, health and nutrition, (iii) a sharper focus by Pronasol on its more effective components is needed. Finally, it is of the essence to pursue further the reforms to the institutions and regulations that are the primary determinants of poverty.

VIII.2 Issues for Further Research.

Many issues raised in this paper require further research. I conclude with a brief mention of seven that I believe are among the most pressing from the point of view of policy. First, undernutrition. More evidence based on anthropometric indicators is required given difficulties with the intake-requirements comparisons. As yet we have little systematic information to tell whether the central problem is one of under or malnutrition. Empirical studies of food consumption are also required, in particular, econometric estimates of the price and income elasticities of nutrients. As noted, there are no estimates of these elasticities for Mexico. Yet it is important to determine whether results obtained for other countries (e.g. Behrman and Deolalikar (1987) for India) carry over into Mexico, given differences in diet composition and consumer behavior across countries. Will increasing income improve nutrition or will more efforts have to be channeled to education and improvements of the health environment?

Two, the line of extreme-poverty. The method used in the paper to set $\underline{z}$ relied on minimum cost diets constructed by linear programming methods. But as I already remarked, this can potentially yield overestimates. One promising line of research is to apply the Greer-Thorbecke (1986a,b) methodology and calculate $\underline{z}$ with respect to a caloric level rather than monetary income, allowing consumers to choose any diet given preferences and prices. These estimates would provide alternative values for $P_j(.)$ and $T_j(.)$, which can serve as a check on the results obtained in this paper. A second line of research is to obtain disaggregated information on the components of own-consumption, so that households can be ranked by total food expenditures. This in turn will allow to identify the extremely-poor through a direct comparison of $f(y^f)$ with the monetary cost of the nutritional basket.

Three, intra-household inequality. As I remarked, little is known about this issue in Mexico, which can potentially be very important given that children are over represented among the extremely-poor. Detailed household studies are required for this, but mention should also be made of a technique recently developed by Deaton (1989) that tests for such inequality using only IES data. Implementation of this technique seems relatively straightforward.

Four, targeted benefits for the extremely-poor. Research is needed to determine appropriate foods. What is the income elasticity of demand for

nutritionally adequate foods that are also familiar to the extremely-poor? Research is also needed to determine location of PASSPA. The possibility of using an algorithm to minimize $P(\alpha,z)$ like the one developed by Ravallion and Chao (1989) deserves attention. Given shortcomings in the coverage of the income-expenditure survey we need to ask whether data from the latest population census can be used for this purpose.

Five, rural labor markets. Since arable land is almost exhausted population growth implies that the marginal rural poor is landless. Returns to unskilled rural labor will become even more important determinants of the earnings of the rural poor. Yet, as remarked in section V, most household studies in Mexico have concentrated on land owning peasants. Relatively less is known about landless laborers. What is their behavior with regards to migration? How can they benefit the most from rural reform? Does more irrigation reduce the seasonality of labor demand by allowing for double cropping and similar practices? A related issue concerns age-specific participation rates. I remarked in section VI.1 that studies for other countries have found these rates to be higher for the extremely-poor, with effects on their demand for education (Lipton (1983b)). Is this finding confirmed for Mexico? Are differences in age-specific participation rates important, and are they explained by differences in income levels, regions or asset ownership (land/no land)?

Six, the land tenure structure. I have made a plausible but not rigorous case that current institutional arrangements restrict the demand for unskilled rural labor and the returns to land. Clearly, it would be much better to have a formal model of the private/ejido land dichotomy to determine if there are equity/efficiency trade-offs associated with these forms of land tenure. Equally important, assuming it is desirable to develop a fuller market for land, how should this be done? Current market valuations for land may not reflect its scarcity value given existing distortions in prices, entry, land use, etc.. More work is needed on the appropriate sequence for reform. Should input and output prices be aligned first? Assuming ejidatarios are given marketable titles to their land, should there be an initial period where land sales are banned until information about the proper value of land is generally accessible?

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